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Archives of Neurology and Psychiatry

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AN ACCOUNT OF THE WITCH CRAZE IN SALEM, WITH REFERENCE TO SOME MODERN WITCH CRAZES *

CHARLES S. POTTS, M.D.

PHILADELPHIA

Belief in witchcraft and the prosecution and execution of those accused of it have existed in all countries from the earliest times. Even now the belief is prevalent in certain parts of this state; and it is especially prevalent among the negroes of all countries. In the early days of this country such a belief seemed to be especially prevalent in the New England colonies, the first case of witchcraft occurring at Springfield, Mass., in 1645. From that date sporadic cases appeared from time to time until 1692, when the epidemic of accusation in Salem, Mass., and its vicinity occurred. During a period of four months, 250 persons were accused and put in jail. Of these, nineteen were hanged and their property confiscated. Two died in prison from exposure and bad treatment, and one was pressed to death, a pleasant mode of torture, which will be described later. It must be remembered that this represented a rather large percentage of the population at that time.

For much that is to follow I am indebted to an interesting book, entitled "Witchcraft in Salem Village," by W. S. Nevins.

ORIGIN OF WITCH CRAZE IN SALEM

The craze had its beginning in the home of the Rev. Samuel Parris, the pastor of the church in Salem. His family consisted of a daughter aged 9, a niece, Abigail Williams, aged 11, and a servant, Tituba, who was half Indian and half negro. She and her husband had come from the West Indies where belief in witchcraft was very strong. Associated with these were four other girls—Ann Putnam, 12 years old, the daughter of Thomas Putnam; Mercy Lewis, 17 years of age and a servant in his family; Elizabeth Hubbard, 17 years old and a niece of the village physician, and Sarah Churchill, aged 20, a servant in the family of George Jacobs, Sr., who, with his wife, was afterward

* Presidential address delivered before the Philadelphia Psychiatric Society, Jan. 8, 1920.

accused. Mercy Lewis at one time had lived in the family of the Rev. George Burroughs, who was also accused. Several of these persons belonged to prominent families. It will be noted that some or all of them figured in all the trials, although as time went on others also became associated.

It is said that for purposes of amusement the West Indian servant used to practice tricks and incantations common among the natives of her home. During these performances they did strange and unusual things, such as getting into holes, creeping under chairs, assuming odd postures, performing various antics, making odd gestures and uttering foolish, ridiculous speeches. While it is natural for children to do such things more or less, they were not countenanced by their Puritan relatives and masters. Great, therefore, was the consternation when they learned of it. Dr. Griggs, whose niece was one of the participants, was called, and not being able to make a diagnosis, he said, "They are possessed of the devil or bewitched." This became noised about the community, causing the children to become objects of curiosity, which naturally made them show off more. The Reverend Mr. Parris called a meeting of other ministers in the neighborhood, who, after observing, investigating and praying, unanimously confirmed the diagnosis. The supposed victims were questioned and threatened with severe discipline if they did not tell who had bewitched them, and they finally accused Tituba, Sarah Good, described as "a melancholy, distracted person," and Sarah Osburn, a bedridden old woman. The three women being formally accused were arrested and taken before Magistrates Jonathan Corwin and John Hathorne, March 1, 1692. It was arranged to hold the hearing in the village tavern (a circumstance which today will be blamed by many for all that happened afterward), but this did not prove large enough, so they adjourned to the meeting house. Sarah Good, the first to be examined, was a woman, 70 years old, in poor health and with a bad temper. All writers agree that from the first the magistrates were strongly prejudiced against the accused. The testimony also was recorded by prejudiced persons, one of whom was Mr. Parris, an accuser, and, therefore, much that was favorable was omitted from the records. Part of her examination with comments of the examiners is as follows:

Q. Sarah Good, what evil spirit have you familiarity with?
A. None.
Q. Have you made no contracts with the devil?
A. None.
Q. Why do you hurt these children?
A. I do not hurt them. I scorn it.
Q. Who then do you employ to do it?
A. Nobody.

Q. What creature do you employ then?
A. No creature, but I am falsely accused.
Q. Why did you go away muttering from Mr. Parris' house?
A. I did not mutter, but thanked him for what he gave my child.
Q. Have you no contract with the devil?
A. No.

Hathorne then desired all the children to look on her and see if this was the person who hurt them, and they all did look on her and said that this was one of the persons that did torment them. Presently, they were all tormented.

Q. Sarah Good, do you not see now what you have done; why do you not tell the truth; why do you thus torment these poor children?
A. I do not torment them.
Q. Who do you employ then?
A. I employ nobody, I scorn it.
Q. How came they thus tormented?
A. What do I know? You bring others here and now you charge me with it.
Q. Why, who was it?
A. I do not know, but it was some you brought into the meeting house with you.
Q. We brought you into the meeting house?
A. But you brought two more.
Q. Who is it then that tormented the children?
A. It was Osburn.
Q. Who do you serve?
A. I serve God.
Q. What God do you serve?
A. The God that made heaven and earth.

Comment is here made, "She was not willing to mention the word 'God.' Her answers were made in a very wicked, spiteful manner, reflecting and retorting against the authority with base and abusive words, and many lies she was taken in." Personally, I am unable to agree in this with the recorder. Samuel Abbey testified that three years previously William and Sarah Good had come to dwell in his house out of charity; that he had let them dwell there until Sarah Good became "of so turbulent a spirit, spiteful and so maliciously bent" that they could not keep her any longer. Ever since that time "Sarah Good hath carried it very spitefully and maliciously toward them." After she had gone from them they began to lose cattle, several of which were lost "in an unusual manner, in a drooping condition and yet they would eat" . . . and "doth believe that they died of witchcraft." William Good had told him that he had told his wife that they had lost two cows, and she said she did not care if the Abbeys lost all their cows. Sarah Gadge testified that Sarah Good came to her house about two and a half years previously and wanted

to come in. She was told she could not because it was feared she had been with them that had smallpox, whereupon Good fell to muttering and scolding. The next morning her cows died in a sudden, terrible, strange and unusual manner so that some of the neighbors said and the deponent did believe it to be done by witchcraft.

It was here stated that Sarah's husband William had said she was either a witch or would be one very quickly. Mr. Hathorne asked him his reason for saying so of her, whether he had ever seen anything by her? He answered, "No, not in this nature," but it was her bad carriage to him. "And indeed," said he, "I may say with tears that she is an enemy to all good." From this I judge that Mr. Good had been tortured, and in this wise we still have witches.

On this evidence she was indicted, or as one writer says, she was as good as indicted before the hearing—a thing which may happen even now.

TRIAL OF THE ACCUSED

The court that tried all the cases was appointed by Governor Phips. It consisted of nine members. The chief justice was William Stoughton, the deputy governor. He had been educated for the ministry and was not a lawyer. The remaining members were citizens of prominence and influence. It is stated that while the rules of procedure were similar to those of English courts, the rights of the accused were not protected as carefully as they would have been by English judges. A prominent Boston lawyer some years ago wrote as follows: "Its proceedings were absurd and outrageous throughout; all sensible rules of evidence were ignored. There never was in any community, where the English common law was the citizens' birthright, such cruel and wanton violations of right, such absolute denials of justice as at Salem in 1692." Before they were tried the accused were treated with great severity. One writer says, "The accused were treated, from the moment some babbling child uttered a suspicious word against them to the burial of their bodies after execution, with a harshness little short of brutality, and with far more severity than any evidence would indicate that persons accused of other crimes in those days were treated." They appear to have been regarded as veritable devils themselves, ready to torment anybody. The two old women just mentioned were for several weeks taken every night to the jail at Ipswich, a distance of ten miles, and brought back in the morning. They and most of the others were kept in chains, and a bill of the Boston jailer exists which reads, "To chains for Sarah Good and Sarah Osburn fourteen shillings." It is noteworthy that one of the judges, Nathaniel Saltonstall, resigned after the first trial because "he was very much dissatisfied with the proceedings of it." The accus-

ing persons are spoken of during the trials as "the afflicted." Their performances delayed them considerably and Thomas Newton, the prosecuting attorney, wrote to the clerk of the court, "I fear we shall not this week try all we have sent for, by reason the trials will be tedious, and the afflicted persons cannot readily give their testimony, being struck dumb and senseless for a season."

While all of the testimony is interesting reading, I have tried to detail only that which seems to be of medical and psychologic interest.

At Sarah Good's trial, Elizabeth Hubbard, one of the afflicted, said she saw the apparition of Sarah Good "biting, pricking, pinching and almost choking me to death," and that she had continued to do so until March 1, the day of her hearing. She had also seen the apparition of Sarah Good afflict Elizabeth Parris, Abigail Williams, Ann Putnam and Sarah Vibber. During the trial she was afflicted and saw the accused with invisible hands take a censer off the table and carry it outdoors.

Sarah Vibber, a woman 36 years old, said that Good tortured Mercy Lewis, April 11, and herself, May 2, by pressing her breath almost out, and also afflicted her infant so that she and Vibber could not hold it. Since then the apparition of Sarah Good had pinched, beaten, choked and pricked her with pins. Subsequently, Good's apparition came into her room one night, pulled down the clothes and looked at her four year old child, and it had a great fit. It will be noticed that this woman was not afflicted until two months after the accused was arrested. During the trial one of the witnesses cried out that Good had stabbed her and had broken the knife blade in so doing. The blade was taken from her clothes where she said she had been stabbed, whereupon a man arose who stated he had broken that very knife the previous day and thrown away the blade. He then produced the remaining part. It was shown that the girl had deliberately picked up the blade and placed it in the bosom of her dress. Sarah Good was convicted and hanged, July 19. As she stood on the scaffold the Reverend Mr. Noyes said to her, "You are a witch and you know you are a witch."

Sarah Osburn was an invalid and confined to her bed most of the time. Three people declared that she had said she was more likely to be bewitched than to be a witch. She was asked what made her say this and she replied that she was frightened one time in her sleep, and either saw or dreamed she saw a thing like an Indian, all black, which did pinch her in the neck and pulled her by the back part of her head to the door of the house. If Freud and his disciples had lived then, they could no doubt have decided her guilt or innocence by an analysis of this dream. She was sent to jail in Boston, and there died from exposure and ill treatment.

Martha Corey, a very intelligent woman, about 60 years of age, was arrested and had her first hearing March 21, 1692. It is stated that she denounced the witchcraft accusations from the beginning. Ann Putnam was her principal accuser, but she was well supported by all the others. Two of the inquisitors first paid her a visit and endeavored by cross-questioning and brow-beating to obtain a confession, but without success. One of the strongest points against her, according to them, was that on their way to visit her they had called on Ann Putnam and asked her to describe the clothes Martha had on when she made her spectral visits. Ann stated that she had just made one of these calls, but had so blinded her that she could not see what clothes she wore. When, however, they were questioning the accused, she inquired "if the afflicted had attempted to describe her clothes." This they claimed showed supernatural wisdom on her part. As a matter of fact, it was a proper question as in all previous cases the clothing worn when they made their visits had been described. They also made much of her statement that "she did not believe there were any witches." A sample of the examination at her first hearing is:

Hathorne. You are now in the hands of authority. Tell me now why do you hurt these persons?

A. I do not.

Hathorne. Who doth?

A. Pray give me leave to go to prayer.

Hathorne. We do not send for you to go to prayer, but tell me why you hurt these.

A. I am an innocent person. I never had to do with witchcraft since I was born. I am a gospel woman.

Hathorne. How could you tell then that the child was bid to observe what clothes you wore when some one came to speak with you? (Cheever interrupted and bade her not begin with a lie.)

Hathorne. Who told you that?

A. He said the child said—

Cheever. You speak falsely.

Hathorne. Why did you ask if the child asked what clothes you wore?

A. My husband told me the others told.

Hathorne. Goodman Corey, did you tell her?

The old man denied that he had.

Hathorne. Did you not say that your husband told you?

No answer.

Hathorne. How dare you lie to this assembly? You are now before authority. I expect the truth. You promised it. Speak now, and tell who told you what clothes.

A. Nobody.

During this one of the children exclaimed that a man was whispering in Martha's ear. She was asked, "what did he say to you?" Her reply was, "We must not believe all that these distracted children say."

The Reverend Mr. Parris in his report writes: "It was noted when she bit her lip, several of the afflicted were bitten. When her hands were at liberty the afflicted were pinched." It was asked, "Do you not see that these women and children are rational and sober when your hands are fastened?" Immediately they were seized with fits and the bystanders said she was squeezing her fingers. Some one exclaimed, "Sne hath bit her lip, and immediately the afflicted were in an uproar." During this examination she was badgered by every one present, especially by the Reverend Mr. Noyes. A Mrs. Pope threw her muff at her and followed it with her shoe which struck her on the head. This woman was an important witness in several cases and subsequently acknowledged her error. Mrs. Corey was hanged, September 22, previous to which she was excommunicated by the Reverend Parris and two deacons of the church. Shortly after Giles Corey, her husband, 80 years old, was arrested. He had testified against his wife. During his examination the afflicted suffered so much from fits and pinches that his hands had to be tied. When he turned his head to one side, their heads were likewise turned, and when he drew in his cheeks, their cheeks were sucked in. What was considered strong evidence was given by a 16-year-old boy, who said that about August 20, Giles Corey told him that he wanted some platters as he was going to have a feast. . . . He took them and carried them away, being gone about a half hour, then he brought them back, went away and said nothing. It was believed that it was not Giles Corey in the flesh who had either borrowed or returned them. At his trial in September he refused to plead, or "stood mute," as the law termed it. For this he was pressed to death. This consisted in laying the victim naked on his back on a hard floor and placing on his body "as great a weight of iron as he could bear and more." He was given on the first day three morsels of the worst bread, and on the second day three draughts of standing water that should be near the prison door, and in this situation this should be alternately his daily diet until he either answered or died. He lived two days. This is said to be the only case in which this law was enforced in New England.

Rebecca Nurse was the mother of eight children and in good circumstances. She was accused of sundry acts of witchcraft directed toward Mrs. Ann Putnam, Ann Putnam, Jr., and Abigail Williams. Her formal accusers were Thomas and Edward Putnam. During the hearing Mrs. Ann Putnam cried out, "Did you not bring the black man with you? Did you not bid me tempt God and die? How often have you eat and drunk your own damnation?" To this the accused replied, "O Lord help me," and spread out her hands, whereupon it is recorded that "the afflicted were grievously vexed." Her answers to all questions were particularly straightforward and sensible. When asked if

she thought the afflicted suffered against their wills or not, she replied that she did not think they suffered against their wills, and she did not believe they were bewitched. She was asked why she had not visited the afflicted. She answered that she was afraid she would have fits also, whereupon all the afflicted had fits abundantly. Every time she moved her hands the afflicted persons were seized with violent fits of torture. If she held her head to one side the afflicted also held theirs, and one of them had her neck set in that position. Seeing this, another cried out, "Set up Goody Nurse's head, the maid's neck will be broken." When some one set up Nurse's head it was observed that the afflicted one's was immediately righted.

At her trial it was claimed that she had a "witch mark" on her body. A jury of women was appointed to examine her. They disagreed, some very properly claiming that the mark was due to natural causes. The prisoner herself said that she could give "a sufficient known reason of the moving cause thereof," and asked to be examined by another jury, which request was apparently not granted. Two women also sent a statement to the court as follows: "We whose names are underwritten can testify if called to it, that Goody Nurse has been troubled with an infirmity of body for many years, which the juries of women seem to be afraid it should be something else."

The following written statement sent to the court by John Tarbell is of interest:

> John Tarbell being at the house of Thomas Putnam upon the 28th day of March, 1692, upon discourse of many things, I asked whether the girl that was afflicted did first speak of Goody Nurse, before others mentioned her to her. They said she told them she saw the apparition of a pale faced woman, that sat in her grandmother's seat but did not know her name. Then I replied and said, but who was it that told her that it was Goody Nurse? Mercy Lewis said it was Goody Putnam that said it was Goody Nurse; Goody Putnam said it was Mercy Lewis that told her; thus they turned it upon one another, saying it was you and it was you that told her. This was before any was afflicted at Thomas Putnam's house besides his daughter and that they told his daughter it was Goody Nurse.

A verdict of not guilty was rendered, whereupon all the accusers in court cried out with renewed vigor, and were seized with violent fits, rolling and tumbling about, creating a scene of the wildest confusion. The judges told the jury that they had not carefully considered one expression of the prisoner, i. e., that when a confessing witch was brought as witness against her she said, "What do you bring her? She is one of us." Even then they could not agree on a verdict of guilty, but returned to the courtroom and asked the prisoner to explain the remark. She made no reply, whereupon they found her guilty. It later appeared that she was deaf and had not heard the question. When she was made to understand it she stated that she had meant the witness was a fellow prisoner. This explanation, a per-

fectly good one, was never told the jury. Her conviction was forced by the court which should have protected her interests. She was sentenced to be hanged, but was reprieved by the governor. The church thereupon excommunicated her, and the afflicted renewed their clamor and symptoms. This, together with the influence of some Salem people, caused him to withdraw the reprieve and she was duly hanged. It is noteworthy that the Rev. George Burroughs, who was accused and executed, had had a financial dispute with the Putnams, who were active as his accusers, and their daughter Ann was the most important witness against him.

At the trial of Bridget Bishop, the Rev. John Hale testified that the wife of John Trask desired of him that Bridget Bishop be not permitted to receive the Lord's Supper because "she did entertain certain people in her house at unseasonable hours in the night to keep drinking and playing at shovel board whereby discord did arise in the other families and young people were in danger of being corrupted." He greatly feared that if a stop had not been put to these disorders Edward Bishop's house would have been one of great profaneness and iniquity. It was later said that on the night Mrs. Trask made this complaint she became distracted and remained so until she died. Other records show that she was insane and committed suicide by cutting her throat. George Jacobs, Sr., a well-to-do man of 70 years, was accused by his servant, Sarah Churchill, one of the original accusers. The principal evidence against him was his inability to repeat the Lord's Prayer. His son George Jacobs, Jr., and his wife and daughter were shortly after arrested. The son escaped, but his wife was kept in irons for eight months and then acquitted. The daughter to save herself, confessed that she was a witch, and testified against her grandfather who was hanged. She afterward confessed that she had been made to do this. Part of the confession is as follows:

> The Lord above knows I know nothing in the least measure how or who afflicted them, they told me without doubt I did, or else they would not fall down at me. They told me if I would not confess I should be put down into the dungeon and would be hanged, but if I would confess I should have my life. The which did so affright me with my own vile, wicked heart, to save my life made me make the like confession I did. Which confession may it please the honored court, is altogether false and untrue.

At the trial of Elizabeth Procter the court addressed the affected ones as follows:

> Mary Walcott, doth this woman hurt you? Ans. I never saw her so as to be hurt.
>
> Mercy Lewis, doth she hurt you? (Her mouth was stopped.)
>
> Ann Putnam, doth she hurt you? (She could not speak.)
>
> Abigail Williams, doth she hurt you? (Her hand was thrust in her own mouth.)

Later, Abigail Williams and Ann Putnam were again spoken to by the court, but neither of them could make any answer by reason of dumbness or other fits. By and by they cried out, "Look you there is Goody Procter on the beam," which statement was followed by the accusing of John Procter, the husband, who had come with his wife to court. At their trial the following evidence was given by Elizabeth Booth:

> On the 8th of June Hugh Jones appeared to me and told me that Elizabeth Procter killed him because he had had a pot of cider of her which he had not paid for. On June 8th Elizabeth Shaw appeared unto me that Elizabeth Procter and John Williams killed her because she did not use those doctors she advised her to. . . . Ye wife of John Fuller appeared unto me and told me that Elizabeth Procter killed her because she would not give her apples when she sent for some. . . . The apparitions of Law Shapling and Doc Zerubabel Endicott said Elizabeth Proctor killed them, and the apparition of Robert Stone, Senior, told her that John Procter and his wife killed him, and at the same time Robert Stone, Jr., appeared and said Procter and his wife killed him because he took his father's part.

John Bailey testified to seeing the Procters standing at the door of their house (at which time they were in jail), and after getting a mile from it he became speechless for a time, also that after alighting from his horse he saw a woman coming toward him, but that when he got on his horse again "there stood a cow where I saw the woman." As evidence against John Procter it was stated that at the beginning of the witchcraft prosecutions he had said in reference to the afflicted that he could whip the devil out of them, which seems to be a very reasonable statement, and probably would have caused the witches to vanish. A man stated that he had heard one of the accusing girls say that she had cried out against Goodman Procter for sport. "The girls must have some sport," she added. He testified in his defense that five persons, one of them his son, had been tied neck and heels until the blood came from their noses, in an effort to have them confess. John Procter was hanged; Elizabeth was condemned, but not executed. A family by the name of Wilkins having considerable illness sent for Mercy Lewis and Mary Walcott (heretofore active as accusers) to ascertain the cause. They promptly saw the apparitions of Sarah Buckley and John Willard on the throat and breast of Henry Wilkins. Willard was promptly arrested. At his trial, Ann Putnam testified that the shapes of Samuel Fuller and Lydia Wilkins had appeared in winding sheets and told her, "If I did not go and tell Mr. Hathorne (a magistrate) that John Willard had murdered them they would tear me to pieces." He was hanged.

Martha Carrier, a woman 40 years old, was arrested with four of her children. During her trial "the tortures of the afflicted were so great, that there was no enduring it, so that she was ordered away to

be bound hand and foot, the afflicted in the meantime almost killed. As soon as she was bound they all had strange and sudden cease." Her daughter, 8 years old, testified against her, saying she had been a witch since the age of 6 and her mother made her so. Her son, aged 18, also testified that he had been "in the devil's snare," and that one of his brothers was also. A neighbor stated that after some dispute with her, he had been taken with a swelling in his foot and subsequently had two sores in the groin. The swelling was lanced, and a large amount of corruption came away. The very day that Goodwife Carrier was arrested, he began to get better. Therefore "he had great cause to think that she had a hand in his sickness." She was hanged.

The first charge against Elizabeth How, said to be a kind and charitable woman, was made by a girl 10 years old, whose parents had previously had a dispute with the How family concerning some lumber. At her trial, it was stated this girl had told reputable people "that if she did complain of Elizabeth How in her fits she did not know that she did so," and that they had heard her brother tell her to say that Goodwife How was a witch. In spite of this she was hanged.

At the trial of Susanna Martin, one of her neighbors said that her reason for believing her a witch was her great neatness. For this she was hanged.

Mary Easty was released after trial. Two days after her discharge, Mercy Lewis had a fit. Ann Putnam was sent for to tell who afflicted Mercy. She and Abigail Williams visited her and declared they saw Mary Easty and John Willard (before mentioned) afflicting her body. She was rearrested at midnight and taken to jail, loaded with chains and finally executed.

Abigail Hobbs, who apparently was not well balanced, declared that while in jail Burroughs (later executed) come to her "in his body person," bringing of a half dozen girls for her to afflict by sticking thorns into them, and when she pricked them the real girls cried out with pain and she heard them. She also felt the hand of Burroughs on her arm. In conclusion, she stated that she had killed both boys and girls. She also accused her mother and father. They denied the charge, but after repeated questioning the mother finally confessed that she was a witch and that her husband was also.

Mary Warren, who had been one of the accusers of John Procter, before mentioned, and had testified in other early cases, later said that the afflicted "did but dissemble." The other girls then cried out against her and she was arrested. Part of the record of her examination is as follows:

> After continuing in a fit for some time she said, "I will speak, O, I am sorry for it, I am sorry for it." Wringing her hands she fell into another fit. Then attempting a little later to speak, her teeth were set. She fell

into another fit and shouted, "O, Lord help me, O, good Lord save me," then afterward cried again, "I will tell, I will tell," and then fell into a dead fit again. . . . She said, "I must not speak a word, but I will speak, I will speak, Satan. . . . Avoid Satan, for the name of God, avoid." She then fell into fits again.

She was later released and resumed her occupation of testifying.

Rebecca Eames, while a spectator at some of the executions, was accused by a woman of sticking a pin into her foot and of bewitching her. She was arrested and later confessed that she was a witch. She was sentenced, but not executed. In October, 1692, a new court was appointed which was even more in sympathy with the prosecutions than the preceding one had been. That there might be no question as to their right to hang witches, they had the Colonial statute against witchcraft reenacted, and a few months later reenforced it with the English statute. In spite of this they could not get juries to convict. Two reasons have been given for this; one, because the wife of a clergyman previously active in the prosecutions was accused, the other because "the juries who tried cases in 1692 were composed of freemen only, while those of 1693 were chosen from among all those inhabitants who possessed the requisite amount of property to qualify them as electors under the new charter. Freemen were necessarily church members and not as likely to act independently as the jurors selected from the whole body of the people." Protests began to be made by various communities, and the last three convicted and sentenced were not executed. In May, 1693, Governor Phips issued a proclamation releasing from custody all persons, about 150, held on the charge.

THE PSYCHOLOGY OF THE OUTBREAK

A number of writers have discussed the psychology of this outbreak, notably, Lecky, Munsterberg, Beard and Kittredge. To me, it seems comparatively simple. It was due to hysteria, fomented by religious fanaticism and lying, some possibly of the pathologic type, but most of it malicious. It must be borne in mind that the Puritans were a fanatical and bigoted people, who persecuted vigorously all those who did not agree with their religious convictions. In spite of the fact that they themselves had come to this country to escape persecution on account of their religion, in Salem Quaker women had been dragged half naked through the streets at the tail of a cart and whipped. Baron Pollock, an English lawyer wrote, "It is probable that but for the persecution of heretics, there would have been no persecution of sorcerers." These people led a more or less repressed life and were therefore ripe for any orgy when the opportunity came.

One writer has suggested that much of the evidence was due to hypnotism. In only one instance does this seem likely, i. e., the young

girl who testified against Elizabeth How, said she did not remember making the charge. All the others did remember everything they said and did.

A number of symptoms of hysteria were present. The influence of suggestion and the morbid desire for notoriety are apparent. In each succeeding trial the symptoms became more pronounced and bizarre. Mimicry was frequent, and in one case possibly a hysterical contracture was present. Some had areas of anesthesia and hyperesthesia. These symptoms were encouraged maliciously by older people. It is noteworthy that many of the accused had had difficulties, either legal or otherwise, with their neighbors, or were more or less public nuisances. Also many confessed to being witches and testified against the accused because it was known that those who did so would not be executed. It is also evident that in some cases torture was used to get confessions. Hutchinson, in his history of Massachusetts, writes, "The whole was a scene of fraud and imposture, begun by young girls who at first perhaps thought of nothing more than being pitied and indulged, and continued by adult persons who were afraid of being accused themselves." Many of the active instigators of these prosecutions afterward acknowledged their error, and expressed regret. This did not, however, help those who had suffered.

MODERN WITCH CRAZES

I suppose most people will say that such a thing could not occur today. I believe that it is not only possible, but to a certain extent is already occurring. We are doing many things similar to what these people did. George M. Beard, in his book, "The Psychology of the Salem Witchcraft Excitement in 1692," writes, "that he who should on a wager contract to excite the American people through the emotions, and in that way convert them to any doctrine within three months, and to a denial of the same doctrine within another three months, could if he were moderately skilful, gain his contract and win his wager." This was written about forty years ago, but it is more true today. The people of Salem and its vicinity were justified in believing in witchcraft. Its existence was generally taught by clergymen and others whose opinions were entitled to respect. Where they erred was in depriving the accused of their legal rights, in treating them with unusual severity and in refusing to consider evidence in their favor. Cotton Mather who, as is well known, was one of the most influential men in the colony, wrote to the judges to exercise great care and not to convict on spectral evidence alone. He further stated, "It is certain that devils have sometimes represented the shapes of persons not only innocent, but very virtuous." No attention was paid to this, and convictions were repeatedly secured on this evidence,

which was contrary to all the rules of evidence then maintaining. The uproar at the trial of Rebecca Nurse puts one in mind of the newspaper accounts some months ago of the hearing on the question of Sunday music in this city before a committee of the legislature. It is said that speakers in favor of the measure were hissed, villified and their voices drowned in the uproar made by the opponents, largely composed of clergymen. In spite of the facts that concerts on Sunday evening are held in many American cities without evident damage to the population and that certain religious denominations are not opposed to them, statements were made of which this is a sample: "People who recently have come to these shores from lands overrun by bolshevism are the principal opponents to the blue laws." Is this true? When the park commission allowed the playing of baseball in the park on Sunday a well known clergyman at a public meeting characterized it as "anarchy and bolshevism of the worst kind," also that "the park commission have not only broken the Sabbath day, but have committed a very serious offense to our nation, to its laws and the great democracy that endeavors to set an example before the world." When he said this he probably knew that in many places in our nation baseball is played on Sunday, not only for pleasure, but also for gain. We are now suffering from a surfeit of legislation and proposed legislation regulating our habits, our business, in fact, practically everything good or bad that a person is liable to do. To quote a recent editorial:

> Getting a legislature to act upon all manner of essentially personal and petty questions is perfectly easy. This state solemnly forbids playing any game of cards in a public resort. That one forbids buying a cigar on Sunday. A number have gravely dealt with the portentious question of giving tips. Every winter produces a sheaf of bills to regulate women's dress. Getting any state to attend to such matters as how and when a kimono shall be worn, or the length and cut of bathing suits, is perfectly easy. . . . But getting a legislature ever to consider public questions of large importance is difficult. . . . Where the law requires a washerwoman's cook stove to be assessed, and a millionaire's wife's diamonds are not assessed, the legislature is deeply engaged with the censorship of moving pictures. Where mob murders are a well recognized institution, the legislature is passing an act to regulate the length of hat pins.

A special target for suppression by legislative enactment seems to be anything which may add to the pleasure and relaxation of the individual. Not long ago, a clergyman publicly stated that moving pictures are one of the biggest menaces leading to vice in this country. To this end we have numbers of societies whose mission is to regulate some one particular thing and that are the instigators of much of this sort of legislation. Not only this, but there are societies whose mission is to regulate public and private institutions, private business,

education; in fact, nothing escapes. The prevailing motto seems to be, Attend to everybody's business but your own, and the less you know about the business you are regulating, the better. To quote Henry Watterson:

> Under the pretense of liberalizing the government, politicians are sacrificing its organic character to whimsical experimentation, its checks and balances, wisely designed to promote and protect liberty, are being loosened by schemes of reform more or less visionary; while nowhere do we find intelligence enlightened by experience, and conviction supported by self control, interposing to save the representative system of the Constitution from the onward march of the proletariat. . . . When they have not gone skylarking or have grown tired of bridge they devote their leisure to organizing clubs other than those of the uplift. There are all sorts, from the Society for the Abrogation of Bathing Suits at the seaside resorts to the league over at Mewville for the care of disabled cats. Most of these clubs are all officers and no privates. That is what many of them are made for. Do they advance the world in grace? One who surveys the scene can scarcely think so.

While many of these organizations are public nuisances, others when properly conducted do much good. Their usefulness is often impaired by lack of tact and respect for the rights and feelings of those to be benefited. This is often due to the lack of knowledge of the world and its people possessed by those who carry on the work. It may be illustrated by a story said to be true:

> A wealthy lady entertained some poor children in her neighborhood. During the afternoon one of them asked her if her husband drank, to which she replied, "He takes a drink now and then but never to excess." Then the child asked, "Does he ever beat you?" The lady, becoming very indignant, exclaimed, "Child, how dare you ask me such a question?" Whereupon the child answered, "My mother told me before I came here to act like a perfect lady, and that is what I heard you ask her."

The feelings of many of these objects of solicitude seem to be well described in the following verses appearing in a daily paper not long ago:

> Oh, a workman who was weeping with despair,
> Cried, "The women's clubs have tracked me to my lair.
> I will flee the whole caboodle
> In this land of Yankee Doodle
> Where there's nothing but compulsion everywhere.
>
> "They will legislate the pattern of my shoes.
> They will censor my amusements and my news.
> I can have no more endurance
> With their plans for new insurance
> Which will eat my little income up with dues.
>
> "Oh! I am weary of the struggle and the strife
> Gainst this most efficient legislated life.
> For my uplift they are burning,
> While I am all their efforts spurning,
> Ere they make me wed a legislated wife."

Many of these organizations and individuals who are ambitious to have the world run according to their ideas, in order to gain their ends are guilty of false and reckless statements, of advocating the confiscation of legally owned property, of breaking laws themselves in order to capture those who in their opinion are breaking laws, and of villifying and slandering those opposed to them. We have heard that those who prosecuted the witches in Salem were guilty of many of these things, and it seems probable that with a little more power the modern regulators will advocate the electric chair for those who differ from them. A still more serious thing is that those whose duty it is to enforce the law engage in orgies of persecution in which people's rights are trampled on with impunity and much injustice is done, frequently without redress. Russia in the days of the czar had something to learn. We are going on the theory if one person may be made good (who does not want to be) it is proper to make thousands miserable. To emphasize these statements, let me abstract some of the news appearing in the daily papers of the past few years. They are not isolated cases, a book could easily be filled with similar ones. July 26, 1918, a public, licensed hotel in the center of the city was raided on the ground that it was a resort for immoral people. At the time, the officers smashed down doors, ripped out transoms and broke open trunks in the search for evidence. They arrested forty or fifty men and women, not only those who were in the place, but those who were on the street in the vicinity. When tried the first time, the proprietor was convicted, but the judge promptly gave him a new trial, and stated:

> No man had the right or justification to break into another man's house, commit depredation, or rummage through his personal belongings without a warrant, even if he knows he will find incriminating evidence. Any man who breaks into another man's house without a warrant and accuses that man of violation of the law, in the same breath admits he has violated the law himself.

At the next trial he was acquitted. The trial judge (not the one who conducted the first trial) in his charge said:

> This raid was conducted in a high handed and illegal manner. . . . These agents took it upon themselves to disregard the law and the rights of citizens, to engage in an unlawful and unwarranted act.

Such performances are supported by people supposed to be law abiding. One may ask what will happen when they secure judges who will do their bidding.

About the same time, three women, each about 60 years old, were arrested for frequenting an immoral resort (their own home). The only evidence was that one of them had three sons in the Navy. A man, enlisted in the Navy, at the instigation of the federal law enforcing officer for the suppression of vice, telephoned her, claiming to be

a shipmate of the sons, and asking leave to call. This he did with a companion. After two of the women had gone to their rooms to dress, the men forced themselves into their rooms. Others who were waiting outside then forced themselves into the house and arrested the women. They were acquitted, the trial judge characterizing the case as one of the most outrageous he had ever heard of.

In Newark, N. J., not long ago, policewomen were ordered to forcibly wash the faces of any girls on the street with painted cheeks, and to have them photographed as vampires.

In New York, in 1918, a wave of hysterical morality caused the raiding of public hotels, apartment houses, restaurants and billiard rooms, with the arresting, without warrants, of 1,100 people. All this to find possible hidden vice. Shortly after Rodman Wanamaker, special deputy police commissioner, advised the use of women to act as police spies in the following way:

> Women of character and ability can be easily found to volunteer for this work. . . . It can be extended . . . so as to have in every block of inhabited territory in this city a woman in charge, whose post it would be and whose duty it should be to keep that block clean and wholesome by becoming acquainted with every person and condition existing therein and reporting as may be directed by the police commissioner everything unlawful or irregular coming to her notice.

A delicate tribute to a well-known characteristic of many women. According to the papers the services of the emergency aides were offered in this city for such work.

About two years ago, a so-called vice crusade was instigated in Wilkesbarre by the chamber of commerce there. It was afterward stated by one of the detectives employed for the work that the chamber of commerce had supplied him with $10,000 to be used in luring innocent girls to houses of ill-fame and otherwise to test the vice conditions of the city.

Recently a prominent aviator of the United States Army, Lieutenant Maynard, was quoted by the Anti-Saloon League as saying that a large number of the casualties which occurred in the recent transcontinental race were caused by flying with hangovers or when drunk. This was published far and wide by the newspapers and a sensation made of it. A frequent heading was "Booze Knocked out Transcontinental Fliers." This was absolutely denied by the gentleman in question. He said that his real statement was, "Many accidents in aviation are caused by the use of intoxicants," and that the Anti-Saloon League had deliberately juggled this to suit their own purposes.

Many of the active advocates of prohibition advocated practical confiscation of the property of those engaged in the manufacture and sale of alcoholic drinks, and also that of private owners. Whatever one may think of the merits or demerits of prohibition, sane people

must recognize that those engaged in a previously legal and exceedingly old business should be dealt with fairly. In this country during the war tavern keepers who had paid a license and whose capital was invested in their business were compelled to close without compensation, when located within certain prescribed areas. England when she did this under like conditions compensated all such.

Certain organizations, which after spending large sums of money to make this country dry, are now, according to the papers, raising large sums to put the world in a similar fix. Yet when a well known newspaper man borrowed money from some brewers in order to purchase a newspaper it was made the subject of a congressional investigation.

In Virginia, as part of the operation of the search and seizure act of that state, we find that police opened the coffin containing the body of a well known person that was being transported by railroad through the state. Women in sleeping cars had their berths searched by male officers while occupied by them, and a number of suspects were shot and killed.

Tobacco is at present in serious danger of execution for witchcraft. Interesting, if not true, are the statements of the Rev. Clarence True Wilson (there should be a question mark after the middle name), who is secretary of the temperance board of the Methodist church: "The cigarette impaired the health of two million soldiers of our Army. We have been sold out by the White House band to the tobacco trust. . . . The American Tobacco Company sent to the soldiers in France doped cigarettes which succeeded in making many of them virtual dope fiends, unable to fight for two hours without collapsing unless they had their smokes." Cigarets had to be pushed into the mouths of the trembling soldiers before they could go over the top, and ignorant doctors called this shell shock. So far as known, these statements have not been denied by newspapers or medical journals.

In a number of states, the sale, and even the smoking, of cigarets is unlawful. In Kansas, newspapers and magazines advertising them cannot be publicly sold. In this same state the superintendent of public instruction (a woman) has forbade the employment of male teachers who use them. Fortunately for education in Kansas, she did not say anything about the female teachers.

It is of interest to note that in Nebraska, for some time a very dry state, where cigarets are prohibited, and where a bill was proposed in the legislature making it a penal offense to have the odor of an alcoholic drink on the breath, not long ago the governor was nearly murdered and the court house burned in Omaha by a mob who wished to and eventually did lynch a negro accused of a certain crime, but not yet

proved guilty. Also in Oklahoma with similar laws, a United States senator was driven from the stage with eggs in one of its towns while attempting to make a speech against the League of Nations.

It will be found by investigation that most lynchings and other outbreaks of mob violence occur in states most prone to freak legislation. This seems to show the lack of mental balance of the people. A member of Congress is recently quoted as stating that there were 80,000 drug addicts in the first draft, and that they were all rejected. The second report of the Provost-Marshall General says that of 3,208,446 men examined, 2,007 were rejected for drugs and alcohol — quite a difference.

In a Missouri mining town a few years ago, 700 foreign born laborers were driven away from their homes by American born miners armed with shotguns, who insisted that all foreign born miners must leave.

During the late war our hysterical temperament was strongly manifested; and when started our antipathy for anything German was much stronger and is now much stronger than in those countries that suffered most from the war. It may be remembered that during the summer of 1918, when it was requested not to use automobiles on Sundays, a gentleman in a nearby town took his wife, who was a cripple, to church in his motor car. While he was in church, a mob cut his tires, emptied his gasoline tanks, damaged his car and subjected him to verbal abuse. The newspapers were full of accounts of physical and other abuse inflicted on those who did not subscribe to liberty bonds. In some cases possibly there was reason for this; in others there was not. In a town in Nebraska, a hall which had been used before the war as a meeting place for German societies was burned during the war by incendiaries, and the fire department made no effort to save it.

One of the results of this peculiar mental state, which I have tried to show now afflicts many of the people of this country, is the meddling with the management of institutions, such as prisons and hospitals for the insane, especially the former. The officials of these institutions are very much in the position of the Salem witches, and are subjected to all sorts of accusation and abuse, usually by people who have no practical knowledge of the subject at all, sometimes by those who have, but who, courting notoriety, want to be right with the crowd. The newspapers, without knowledge of the facts, take great delight in making a sensation of the most trivial charges.

What joy the sob sisters must have received from this account published in a daily paper, concerning a gentleman (we must call them so now-a-days) who was in the highway robbery business (now very popular) and departed this life by suicide in a penal institution not

long since. "Billy loved life too much ever to attempt suicide," said the youngest sister as she sobbed on the shoulder of her older sister. "No one can tell us he killed himself. He had too much 'pep,' and too much to live for."

No doubt there are still many people who need to be separated from their valuables by use of the sandbag and other gentle means of persuasion.

A PLEA FOR SANITY

Possibly some may call me an iconoclast. I am not. I believe heartily in all measures that help the poor and unfortunate, provided, as I have already said, the advocates of these measures and those who carry them out, act with decency and common sense, and not as hysterics and notoriety seekers. Social service, for instance, is a grand thing when it is not secret police service, as for example, when some years ago I was requested, almost ordered, to send a widow, aged 40 years, to the hospital for the insane because she drank beer with men. Needless to say I refused. The same may be said of a number of other organizations and measures. They are useful when sane.

I have tried to show that much is done now in the name of law, order and uplift that is not sane. Dr. Lloyd, at a meeting of this society a few months ago said: "The various crazes of today are an evidence of the unsettled minds of the community." They are therefore legitimate subjects for the attention of this society. Not a little of freak legislation is proposed by medical men, which makes it doubly important that we as medical men and women who study especially mental diseases, endeavor to guide such minds, both medical and lay, into proper channels.

To my mind these are serious days, and anything which promotes morbid and hysterical mental states is dangerous, and worthy of our earnest consideration. Otherwise, we may have a witch craze on our hands that will make that of Salem appear very small, indeed. To quote again Henry Watterson:

> Bigotry is a disease. The bigot pursuing his narrow round is like the bedridden possessed by his disordered fancy. It sees nothing but itself, which it mistakes for wisdom and virtue. But it also begets hypocrisy. When this spreads over a sufficient area and counts a voting majority it sends its agents abroad, and thus we acquire canting apostles and legislators at once corrupt and despotic. . . . The worst of it is that there seems nowhere any popular realization—scarcely any popular outcry. . . . In a nation of undiscriminating voters the voice of the agitator is apt to drown the voice of the stateman.

LETHARGIC ENCEPHALITIS

A REPORT OF FOUR CASES AND AN ANALYSIS OF ONE HUNDRED CASES REPORTED IN THE LITERATURE *

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It seems worth while to report the following cases observed in the Waterbury Hospital, together with a review of the literature and an analysis of one hundred cases regarded by us as typical.

REPORT OF CASES

CASE 1.—*History.*—Miss F. S., aged 25, first complained of diplopia on Jan. 28, 1919. Although at first this was transient, it became more persistent and disturbing. About the same time her mother noticed that the patient, her daughter, had a slight drooping of the right upper eyelid. Except for these symptoms the history was negative. February 5, when the patient complained of headache and general malaise, she was drowsy and answered questions with apparent reluctance. The patient was admitted to the Waterbury Hospital on February 8, with a temperature of 100; pulse, 96, and respiration, 20.

Examination.—She had a dull facial expression. There was drowsiness with marked reluctance to answer questions, although on insisting, they were answered quite intelligently. There was external strabismus of the right eye with ptosis; the pupils were equal and reacted to light; the accommodation reflex was hard to obtain because the patient did not focus on the object. Whistling, wrinkling of the forehead and grinning showed nothing abnormal. The tongue was coated and protruded in the median line; there was no tremor. Heart and lungs were normal. The bladder was distended and 28 ounces of urine were obtained by catheter. There was no rigidity of the neck, the knee jerks were slightly exaggerated, Kernig, Babinski and Brudzinski signs were absent.

Hemoglobin, 90 per cent.; red blood cells, 5,100,000; white blood cells, 7,400; polymorphonuclear cells, 76; lymphocytes, 21; mononuclear and transitional cells, 3; eosinophils, 0 per cent. The urine showed specific gravity 1.026; there were no albumin, no sugar and no casts; there was a very slight trace of acetone and no indican. The blood pressure was systolic 110, diastolic 78.

A lumbar puncture was performed on February 14. The fluid was not under pressure, was clear with 10 cells per c.mm., and there was a very slight increase of globulin; Fehling's was slightly reduced. No organisms were found either by smears or by cultures; the antiformin method was used, but tubercle bacilli were not found. The Wassermann was negative both in the blood and spinal fluid.

Course and Treatment.—During the first week in the hospital her condition remained about the same She was lethargic, lay on her back unless turned, did not speak unless an answer was insisted on, did not ask for food. She had to be

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* From the Medical Service of the Waterbury Hospital.

fed with a spoon, but there was no dysphagia. The ptosis was constant, but the strabismus varied in extent. The temperature varied from 98 to 100 F.; pulse from 78 to 110; respiration from 17 to 24.

At the end of the first week the drowsiness became less and the strabismus inconstant. Irregular jerkings, a very marked and coarse intention tremor, and apparent incoordination of both upper extremities became evident. Eye grounds were normal on the day of admission and also seven days later.

A blood count was made every other day (Table 1). The systolic blood pressure varied from 108 to 118; the diastolic from 70 to 76.

TABLE 1.—Total and Differential Leukocyte Counts (Case 1)

Date	White Blood Cells	Polymorpho-nuclears	Lympho-cytes	Mono-nuclears	Trans-itionals	Eosino-phils
Feb. 8	7,400	76	22	2	0	0
Feb. 10	6,800	72	17	1	2	1
Feb. 12	8,200	79	17	1	0	1
Feb. 14	7,800	74	19	1	0	1
Feb. 16	9,200	76	18	2	2	2
Feb. 18	6,800	70	16	1	2	1

The results of creatinin and sugar determinations made of the blood were: creatinin 1.1 mg. and sugar 45 mg. per 100 c.c. of blood.

During the second week the patient's condition improved rapidly. The retention of urine entirely disappeared and the bowels moved after simple laxatives. She gradually became more alert and by the end of the second week was mentally normal. When asked to describe her feelings and her mental state of the week before, she said that she could not, as she remembered only that she had been brought to the hospital and was catheterized several times. The patient was discharged as cured on March 4.

Case 2.—*History.*—M. S., female, aged 6, entered the hospital, July 14, 1919. The family history was negative. She had had smallpox several years before and influenza in October, 1918. Her present illness began three weeks before admission and was ushered in by vomiting several times during twenty-four hours. On the next day she complained of severe abdominal pain and was put to bed, where she remained for seven days. During this time the abdominal pain was quite distressing and the vomiting frequent and persistent. During the second week she felt better and began to walk about, but her parents noticed that her actions were peculiar and that she spoke unusually loudly. During the latter part of the week squinting of the left eye was noted; also partial bilateral ptosis which was essentially marked at night. In the third week she was again put to bed because of abdominal pain and vomiting. The pain soon subsided. The left external strabismus persisted, but the right eyeball lost all movements. Her intelligence at this time was good, but she spoke very little and had lost the loud tone of voice. Dysphagia and inability to walk were first noticed at this time.

Examination.—On admission to the hospital she was well nourished, very drowsy, with a temperature of 100.2; pulse, 100; respirations, 22. There was external strabismus of the left eye with slight facial palsy and ptosis on the same side. There was no rigidity of the neck, but a suggestion of Kernig's sign. Heart and lungs were normal. Deep reflexes were slightly exaggerated; the Babinski sign was negative. There was incontinence of urine and feces. She could be aroused to answer simple questions, but none that required much thought; she could differentiate large from small objects and could distinguish

one coin from another. Soon after answering questions she would again sink into lethargy, occasionally uttering little whines, but for the most part remaining quiet and apparently asleep. She would awaken for meals, but resisted feeding because of dysphagia. This necessitated gavage. After several weeks in the hospital she became stuporous and more restless. The right arm and hand moved incessantly, trying to grasp one's hand when approached. The left extremities appeared to be partially paralyzed. Her eyes stared inattentively. At this time there was right internal strabismus; the pupils reacted moderately to light but were irregular, the right being more dilated. Eye grounds were normal during the entire illness.

Course and Treatment.—About August 1 the patient seemed to be in deep coma. The right arm and leg were very inactive, but responded to painful stimuli. Sensation and acuteness of the special senses were much lessened.

Fig. 1 (Case 2).—Appearance of patient five days after admission to hospital.

Corneal reflexes were much diminished, and "films" persistently formed over the corneas. In the parts exposed by the open eyelids there was also a low grade conjunctivitis which required constant attention.

During this time the patient would not swallow any food or medicament, the most careful attempt leading to alarming spells of choking and coughing. She was fed by tube for five weeks; food with a value of from 1,000 to 1,200 calories was introduced daily, which kept weight and color good.

The heart action was rapid but fairly strong. At times, however, the pulse rate would rise to 150 or 160, and would be irregular in force and rhythm. With this acceleration of pulse rate there was irregular breathing, profuse perspiration and choking. These attacks occurred mostly at night. Records of the temperature, pulse and respiration taken frequently during one of these attacks gave the following data:

TABLE 2.—Temperature, Pulse and Respiration Records (Case 2)

Time	Pulse	Respiration	Temperature
8 p. m.	148	34	99.8
9 p. m.	158	36	102.0
10 p. m.	152	36	102.4
12 p. m.	160	32	100.4
2 a. m.	148	30	99.6
4 a. m.	126	28	98.0
6 a. m.	132	28	99.0

During the month of August restlessness and whining, which characterized the latter part of her illness, became progressively more marked. While the patient was regaining partial use of the paralyzed limbs, a coarse irregular tremor appeared. During this time the elbow and knee jerks were exaggerated and the Babinski reflex and ankle clonus were elicited on both sides. A marked right clubfoot next developed, necessitating the application of a plaster cast which was kept on for two weeks. The left foot was only slightly affected.

Fig. 2 (Case 2).—Appearance of patient the day she left the hospital.

By the latter part of August great improvement had begun. The pupils became regular, ptosis disappeared and the characteristic cry was changed occasionally to almost a speaking tone. At this time dysphagia disappeared to the extent that esophageal feedings were discontinued. During this period the patient exhibited rather striking modesty about being exposed. Even though her mental state was seemingly dull and she could not answer simple questions, she would always cover very promptly any exposed parts with her clothing or the sheets.

By the third week of September she began to take notice of what was going on about her. She nodded her head in answer to questions and took interest in her doll. At night she was frequently noisy and restless. By this time the facial palsy as well as ankle clonus and the Babinski reflex had entirely disappeared. Toward the end of September the patient's mind had brightened greatly, her special senses had returned to normal, and she was able to walk a little with assistance. She became more irritable and erratic, talking to herself and laughing, but creating disturbance on the slightest provocation.

Laboratory Findings.—Urine: Only July 4, the urine was cloudy, yellow, with specific gravity, 1.020; moderately cloudy from albumin; there were no sugar, a moderate number of granular casts, no indican and no acetone. July 13, and at the next three examinations, practically the same findings resulted with the exception of a faint trace of acetone. On August 15, there was a faint trace of albumin and an occasional hyaline cast. Before the patient was discharged the urine was entirely normal. The findings are summarized in Table 3.

TABLE 3.—Blood Findings (Case 2)

Date	Hemoglobin	Red Blood Cells	White Blood Cells	Polymorphonuclears	Lymphocytes	Mononuclears	Transitionals	Eosinophils	Basophils
July 5	48	2,850,000	5,600	47	46	3	2	1	1
July 24	56	2,920,000	6,100	58	34	4	2	2	0
Aug. 2	64	3,200,000	6,800	49	45	4	1	1	0
Aug. 21	..	.....	8,300	70	23	5	1	0	1
Sept. 15	..	.....	7,200	68	26	4	1	1	0
Oct. 1	78	4,050,000	6,900	64	29	3	2	1	1

Wassermann Test: The Wassermann reaction of the blood was negative.
Widal Test: This test was done on July 18, August, 12 and September 28, with negative results each time.

Spinal Fluid: Spinal fluid examination yielded the results noted in Table 4.

TABLE 4.—Spinal Fluid Findings (Case 2)

Spinal Fluid	July 5	July 24
Amount	20 c.c	11 c.c.
Pressure	+	0
Cell count	8	10
Nonne reaction	0	0
Noguchi reaction	++	+
Albumin	+	+
Fehling's	++	++
Bacteria	0	0
Tubercle bacillus	0	0
Wassermann test	0	0

The stools were negative. Plating on Conradi-Drigalski and Endo mediums showed no growth of typhoid bacilli. Throat and nose cultures were also negative.

The patient was discharged from the hospital October 3, and when last heard of, was almost entirely well, except for tremor of both upper extremities.

Case 3.—*History.*—P. Q., male, aged 50, first complained of diplopia and of some difficulty in swallowing, February 21. At about the same time his family noticed that he was unusually quiet. On February 27, he gave up his work because of increased drowsiness, having fallen asleep several times at his bench in the factory.

Examination.—He was admitted to the Waterbury Hospital on March 2, the temperature was 100.8 F.; pulse, 84; respiration, 20. He was drowsy, and his face mask-like, absolutely devoid of expression.

The pupils were equal, regular and reacted to light and accommodation. There was left ptosis and moderate facial palsy. Speech was very slow, somewhat scanning, articulation and phonation normal. He answered questions very slowly, as if meditating, but quite accurately. On being ordered to raise his arm or leg he did so very slowly. There was a latent period between the command and the execution which could not be shortened, no matter how vigorously the order was given.

The tongue was coated, had no tremor and protruded in the median line. Pharynx, heart and lungs were negative. The blood pressure was systolic 128, and diastolic, 84. There was no rigidity of the neck, no tache cérébrale, no Kernig's sign. The knee jerk on the right seemed to be slightly increased and there was false ankle clonus on the same side. The cremaster and abdominal reflexes were normal.

On the day of admission, the white blood cells numbered 7,400; polymorphonuclears, 70; lymphocytes, 25; mononuclears and transitionals, 3, and eosinophils, 2 per cent. Urine: Specific gravity, 1.024; acid, yellow; no albumen or sugar. There was a slight increase of indican and a trace of acetone.

On the third day after admission 12 c.c. of cerebrospinal fluid were withdrawn; there was no increase of pressure; eighteen cells per c.mm. were found; polymorphonuclears, 16; lymphocytes, 76, and mononuclears, 8 per cent. Only fifty cells were counted, as there were very few cells in the smear. The Wassermann test was negative. Bacteriologic smears and cultures yielded negative results.

Creatinin and sugar determinations of the blood were made: creatinin, 1.4 mg. and sugar, 63 mg. per 100 c.c. of blood. Alveolar carbon dioxid determination by the Marriott method was 40. Blood Wassermann and Widal tests were negative.

Course and Treatment.—The patient's condition remained about the same for sixteen days. The temperature ranged between 98 and 101 F., the pulse rate between 74 and 126; respirations were never above 24. His most distressing symptom was difficulty in swallowing; he had to be fed very slowly and carefully in order to avoid distressing spells of coughing and choking. The ptosis was most marked on the third day, the patient being entirely unable to lift the eyelid. Internal strabismus was also present, but varied from time to time. There was no particular rectal or vesical disturbance in this case.

March 18, the patient's mental state was much brighter and he was able to swallow much better. The temperature, pulse and respiration were normal. The patient continued to improve rapidly and was able to sit out of bed during his fourth week in the hospital. The facial palsy disappeared quickly, but some ptosis persisted. The drowsiness disappeared entirely and he was discharged cured on April 6.

Case 4.—*History.*—E. C., a girl, aged 5½, with a negative family and personal history, except for a mild attack of influenza in November, 1918, had malaise, occasional headache and general indisposition during the week of Oct. 20, 1919. Occasionally the child exhibited twitchings of the head and right side of the face. She was put to bed on October 25, and during the next six days had irregular fever, obstinate constipation, involuntary emission of urine and marked disturbance of mentality. At first she was markedly delirious and apparently had visual hallucinations, but soon the delirium was less constant and alternated

with periods of drowsiness and lethargy. She became hard of hearing. There was also considerable dysphagia, and for two days prior to admission she took little nourishment.

Examination.—She was admitted Nov. 3, 1919, at 2 p. m., with a temperature of 102.2 F.; pulse, 100; respiration, 28. She was well nourished, quiet and apparently sleeping when left alone, but restless and tossing when an attempt was made to examine her. From time to time she uttered a peculiar cry, and when her eyes were opened, would stare about aimlessly. The pupils were equal, regular, dilated, reacted poorly to light. Mouth and pharynx, heart and lungs were normal. There was neither rigidity of the neck nor Kernig's sign; knee jerks and ankle jerks were normal; there was no Babinski reflex. Results

Fig. 3 (Case 4).—Appearance of patient, the fourth day after admission to hospital.

of otoscopic and ophthalmoscopic examinations were negative. Throat smears and cultures were negative for diphtheria and for Vincent's angina.

The white blood cell count soon after admission to the hospital was 15,400; polymorphonuclear cells, 74; lymphocytes, 18; mononuclears and transitionals, 7; eosinophils, 1 per cent.

Course and Treatment.—Three hours after admission the spinal fluid was under normal pressure, and clear, except for a slight tinge of blood. Globulin was slightly increased. The differential cell count was: polymorphonuclears, 4; lymphocytes, 78; mononuclears, 18 per cent. Smears and cultures showed no bacteria. A search for tubercle bacillus with the antiformin method was negative.

November 4: The delirium and restlessness were less marked; involuntary emission of urine and feces was reported; all nourishment was refused and feeding by tube three times daily was ordered. Physiologic sodium chlorid solution, 5 ounces per rectum, was given every six hours.

November 5: The von Pirquet and Widall tests were negative.

November 6: Wassermann on the spinal fluid was negative. Blood findings were: hemoglobin, 90 per cent.; red blood cells, 4,440,000; white blood cells, 16,200; polymorphonuclears, 75; lymphocytes, 17; mononuclears and transitionals, 7; basophils, 1 per cent. The carbon dioxid alveolar air determination gave 45.

November 8: There were ptosis on the right and facial paresis on the same side, also coarse tremor of arms and hands. The child changed her position but very little, being mostly supine with hands folded across her chest and fingers interlaced (Fig. 3). During the last forty-eight hours she was drowsy and lethargic most of the time. Deglutition was difficult, but she was able to take sufficient nourishment.

November 9: Peculiar vasomotor phenomena were observed during the last twenty-four hours. One half of the ear, for example, was flushed, while the other half was completely blanched. Flushing of one or the other cheek was frequent. The right hand was cold and blue, although the radial pulse was the same on both sides.

November 10: There was moderate rigidity of the neck and slight retraction of the head. There was a suggestion of Kernig's sign with exaggerated knee jerks, with ankle clonus and Babinski reflex on the left. Fifteen c.c. of clear spinal fluid was withdrawn under slightly increased pressure. Cell count was 18 per c.mm. Differential: polymorphonuclears, 6; lymphocytes, 78; mononuclears, 16 per cent. Smears and cultures were negative.

During the rest of that day the condition remained about the same. The stupor was deep. She swallowed with great difficulty and at times perspired very profusely. Surface temperature was taken on the paralyzed and normal side of the face and over normal areas and those with vasomotor disturbances, but no definite differences could be detected. Toward evening the patient's condition became much worse. The respirations were irregular and Cheyne-Stokes in character. The pulse became progressively more rapid, but remained regular to the end. A pulse tracing two hours prior to patient's death showed no irregularities.

The patient died at 1 a. m., November 11, apparently with pulmonary edema as the terminal event.

Necropsy Findings.—Necropsy was performed eight hours after death by Dr. George M. Smith. There were no suggestive anatomic findings, outside of the brain. A specimen of urine obtained postmortem showed neither albumin nor casts, neither acetone nor diacetic acid, but 2.5 per cent. of sugar. Cultures taken from the intestines for typhoid bacilli were negative.

Examination of the brain revealed congestion of the meninges with considerable dilatation of the veins. Over the parietal region there appeared, here and there in the pia arachnoid, a small exudate, following the course of sulci. At the base there was intense congestion with a grayish yellow exudate of moderate degree in the region of the optic chiasm. Cultures taken from the exudate and from the cortex of the brain showed no growth. Smears showed red blood cells, lymphocytes, mononuclear cells and an occasional polynuclear cell. No organisms were found with methylene blue and acid fast stains.

On section of the formadehyde hardened brain, the ventricles appeared slightly dilated, but the ependyma and choroid plexuses were normal. Sections were made through the meninges and cortex of the brain and from various parts of the base. Sections from the cortex (parietal and occipital lobes) showed in each instance considerable involvement of the meninges. The blood vessels were dilated and there was an accumulation of inflammatory cells in the pia arachnoid consisting chiefly of lymphocytes and mononuclear cells. The cortical gray and subcortical white matter showed dilated vessels, and here and

Fig. 5 (Case 4).—Midbrain, region of optic thalamus; capillary engorgement, dilatation of blood vessels and perivascular exudation.

there capillaries surrounded by a few lymphocytes. Sections of the base of the brain showed most marked involvement in the region of the optic thalamus. Here no hemorrhages were evident, but the capillaries were distended with blood. There was marked perivascular infiltration with lymphocytes and mononuclear cells. In places underneath the pia arachnoid and in the substance of the brain an accumulation of lymphoid cells was present. In other places there was a heaping up of endothelial cells of the pia directly in contact with the brain substance.

In the pons the vessels were congested, but the perivascular infiltration was less marked. In the medulla, at the floor of the fourth ventricle, the congestion was much more apparent. There were several hemorrhagic areas, the vessels and capillaries were dilated and surrounded by a perivascular infiltration of lymphocytes and mononuclear cells.

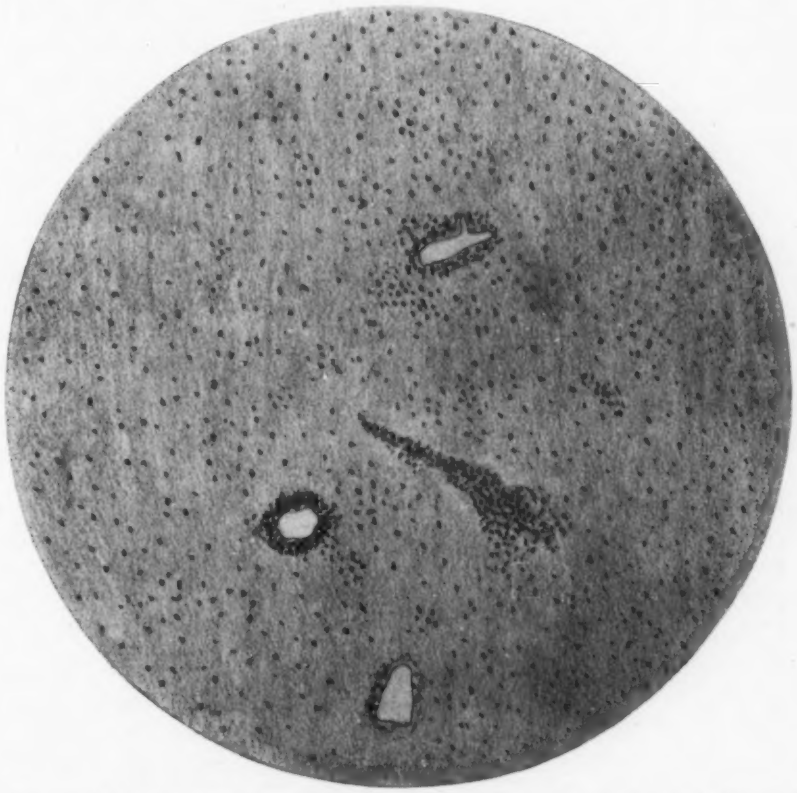

Fig. 4 (Case 4).—Region of floor of fourth ventricle; engorged blood vessels and perivascular infiltration. Diffuse exudate in gray matter.

ANALYSIS OF THE CASES REPORTED IN THE LITERATURE

In reviewing the literature on encephalitis lethargica the main difficulty lies in the uncertainty and inauthenticity of many of the cases, particularly those reported in the early part of the epidemic. It is evident that, even at this date, neither the etiology nor the clinical

entity of the disease has been definitely ascertained. The Australian cases began abruptly with convulsions, and coma was a characteristic feature. In none of the cases was ophthalmoplegia present, and lethargy was not a feature except in those reported by Burnell.[1] Pathologically, the investigations of these cases were all fruitless except those reported by Breinl[2] who concluded that the pathologic findings justify the opinion that the cases were forms of poliomyelitis.

Since that time the consensus of opinion seems to have been that encephalitis lethargica differs decidedly from poliomyelitis and anything else that has been described. It is to be mentioned here, however, that very recently Loewe and Strauss [3] cultivated a virus obtained from cases of encephalitis lethargica on culture mediums, with the methods employed by Noguchi for the cultivation of spirochetes, and they report finding an organism very similar to that described by Flexner and Noguchi in poliomyelitis. The material for investigation obtained by these authors presumably is from cases reported by Sachs,[4] some of which are as typical as any that have been reported during the epidemic. Therefore the statement of the above investigators may be of great significance since it corresponds with the conclusions drawn by Breinl from his studies of the Australian cases. This would tend to indicate that the various forms of the "mysterious diseases" may be different forms of poliomyelitis.

For the present, however, it seems reasonable that the cases of peculiar lethargy and ophthalmoplegia reported during the last eighteen months represent a definite clinical entity hitherto unknown, unless we include cases that followed influenza epidemics in the past and have been known as Schlafkrankheit, Nona, Coma somnolentum and "catarrhal fever" with "soporosite."

We have attempted to analyze the clinical features and laboratory findings of all the cases reported in the current literature. A great many of these are vague, incomplete and atypical. For the purposes of this analysis we have taken the symptoms given by Bassoe [5] as typical of the disease, and have excluded all cases that totally differ from his description.

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1. Burnell, G. H.: M. J. Australia **2**:157 (Aug. 25) 1917.

2. Breinl, A.: Clinical, Pathological and Experimental Observations on the "Mysterious Disease," a Clinically Aberrant Form of Poliomyelitis, M. J. Australia **1**:209 (March) 1918.

3. Loewe, L., and Strauss, J.: Etiology of Epidemic (Lethargic) Encephalitis, J. A. M. A. **73**:1056 (Oct. 4) 1919.

4. Sachs, B.: Epidemic Encephalitis (Central or Basilar), N. Y. Med. J. **109**:894 (May 24) 1919.

5. Bassoe, P.: Epidemic Encephalitis (Nona), J. A. M. A. **72**:971 (April 5) 1919.

Excluding the cases reported by the special British government board [6] appointed to investigate this disease, we have reviewed 182 cases. From this number we selected 100 cases as being typical and more completely reported.

Age Incidence.—One case mentioned in the literature by Harris [7] may be accepted as congenital. [A woman suffering from undoubted encephalitis gave birth to a normal infant that seemed drowsy. On the third day lethargy developed. This lasted several days with complete recovery.] The youngest patient reported in the literature was 4 months; the oldest 62 years. Fifteen per cent. of the patients were below 10 years of age; 12 per cent. were between 10 and 20; 30 per cent. between 20 and 30; 19 per cent. between 30 and 40; 17 per cent. between 40 and 50, and 6 per cent. between 50 and 60. One patient was 62 years old. There were no age records in twelve of the 100 cases analyzed. The age incidence is shown in Table 5.

TABLE 5.—Age Incidence in Encephalitis Lethargica

Age in Years	Number	Per Cent.
Below 10	13	15
10-20	11	12
20-30	25	30
30-40	16	19
40-50	14	17
50-60	5	5
Above 60	2	2
Total	86	100

Sex Ratio.—Fifty of eighty-three cases, or 60 per cent., were males, while thirty-three, or 40 per cent., were females. The sex of the patient was not mentioned in seventeen cases.

History of Influenza.—This is reported in seventeen cases; in eleven the attack was one month prior to the encephalitis; in two, two months; in two, three months, and in one each, four and six months, respectively.

Symptoms.—Headache was mentioned as a more or less distressing symptom in 28 per cent. of the cases. In most of these it was an early sign of the illness. When lethargy was pronounced headache, of course, became subsidiary.

6. Report on an Inquiry into an Obscure Disease, Encephalitis Lethargica, Local Government Board Reports on Public Health and Medical Subjects, N. S. 121, London, H. M. Stationery Office.

7. Harris, W.: Acute Infectious Ophthalmoplegia, Lancet **1**:568 (April 20) 1919.

Vertigo is mentioned in thirteen of the cases; like headache, it was frequently an early premonitory symptom and disappeared when the disease became well established.

Diplopia is mentioned in 33 per cent. and it was generally early; in many instances it was the earliest symptom. Its duration and severity varied greatly. In some it was so disturbing that the patient was obliged to keep one eye constantly closed. In most cases the diplopia persisted until the patient began to improve.

Ocular palsies were present in 57 per cent. The most common condition was ptosis of one or both lids. External and internal strabismus was next in frequency. Both ptosis and strabismus were frequently present. In a number of cases upward or downward motion was impaired, and some patients were apparently unable to move the eyeball in any direction.

Conjunctivitis is mentioned in five cases, and photophobia in the same number.

The pupils were equal and regular in the majority of instances. In a number of cases, however, inequality or irregularity of the pupil is mentioned. It seemed to bear no relation to the side of the face that was paralyzed. The pupils frequently reacted sluggishly to both light and accommodation, as particularly mentioned by Kennedy.[8] The Argyll Robertson pupil is mentioned in a case reported by Lortat-Jacob and Hallez,[9] also in one reported by Claude and Schaffer.[10] In both cases the Wassermann reaction was positive in blood and spinal fluid. The latter case proved fatal in spite of vigorous antisyphilitic treatment, and the histopathology indicated the diagnosis of encephalitis lethargica. Professor Netter,[11] in discussing the former case, said that in his opinion it was a case of encephalitis lethargica, and thought that an Argyll Robertson pupil may be present in this disease depending on the localization of the pathologic process.

In four cases choked disk is reported: in three engorgement of the retinal veins.

Dysphagia is mentioned in 17 per cent. of the cases.

Definite paralyses are mentioned in thirty-nine cases: in thirty-one, unilateral or bilateral facial palsy; in five, paralyses of the extremities; and in three, of the face and extremities. Mere weakening or partial paralysis of the extremities is not included in this classification.

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8. Kennedy, F.: Epidemic Encephalitis with Stupor, Med. Rec. **95**:631 (April 19) 1919.

9. Lortat-Jacob and Hallez, G. L.: Bull. No. 15-16, May 3, 1919, p. 639.

10. Claude, H., and Schaeffer, H.: Encéphalite lethargique, Bull. et mém. Soc. méd. d. hôp. de Par. **43**:521 (May 29) 1919.

11. Netter, A.: Bull. et mém. Soc. med. d. hôp. de Par. **43**:300 (April 4) 1919.

Tremors were present in 19 per cent. This was coarse and jerking in the majority of instances; in some it was choreiform. Ataxia, as evidenced by the finger-nose test, was present in many cases. Rigidity and catatonia are frequently reported.

There was an abnormal state of mind in 86 per cent. of the cases. In eighty-three it varied from slight drowsiness to profound stupor. It is variously described as listlessness, somnolence, drowsiness, lethargy, emotional stupor and mental inertia. While in some instances the lethargy was so profound that the patient could not be aroused, in

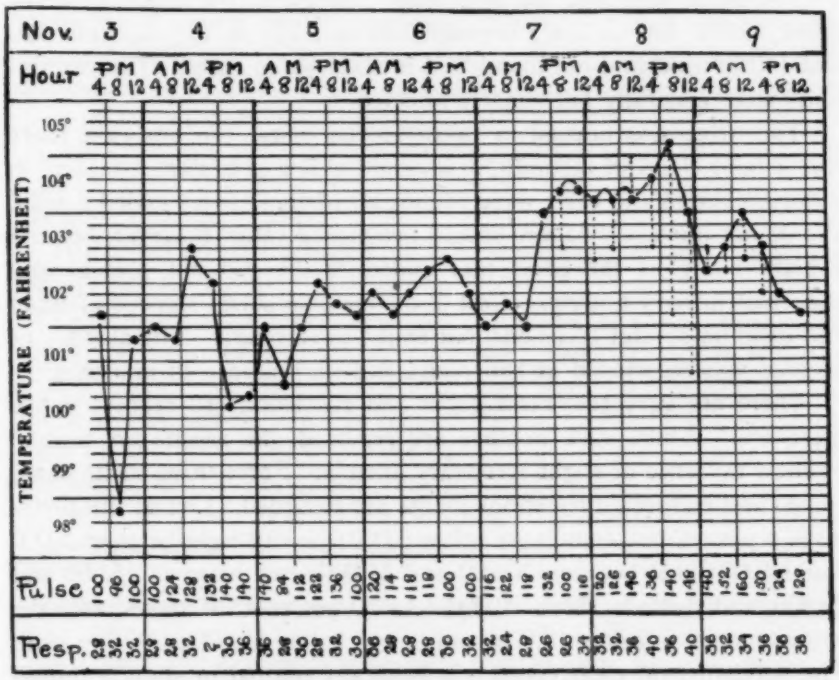

Fig. 6 (Case 4).—Temperature chart.

the majority of cases the mind behaved lucidly under stimulation. The patients answered questions accurately, but only after some delay and with evident effort. They volunteered no information and fell back into apparent sleep after questioning was stopped. In three cases there was active delirium without lethargy. In eleven cases both lethargy and delirium were present during some period of the illness.

The face generally gave the impression of listlessness and was devoid of emotional expression. It is most frequently compared to that of paralysis agitans, with mask-like, blank, immobile features. Kennedy speaks of one case with the facial expression of advanced myasthenia gravis.

The reflexes were normal in twenty-eight cases; exaggerated in twenty-one and markedly diminished or absent in nine; a positive Babinski and ankle clonus are reported in seven cases; in twenty-four, no mention of reflexes is made. There was incontinence of urine and feces in 17 per cent. of the cases, while retention of urine and obstinate constipation are mentioned frequently.

The temperature was normal in six cases; in twenty it was less than 100 F.; in nineteen, between 100 and 102; in thirteen, above 102. In thirty-seven the temperature is not recorded.

The pulse was reported as normal throughout the illness in seven cases; below 100 in nine; between 100 and 120 in six; between 120 and 140 in nine, and not mentioned in sixty-seven cases. The respirations were generally but slightly affected.

The urine was normal in twenty-seven cases. In one case there was a faint cloud of albumin, in another, a few granular casts, and in a third albumin and casts were found; all of these cases ended fatally. We do not think it is of any special prognostic value, however, because a great many of the cases that ended fatally did not present any abnormal urinary findings. Case 2 of our own series showed albumin and casts on several occasions, but ended in recovery. The absence of acetone was mentioned in two cases, and its presence in one case.

There are very few hemoglobin and red blood cell reports in the literature. Where such findings are reported, the results are normal or show evidence of slight secondary anemia. Forty-three white blood counts and eighteen differential counts are recorded. Out of the forty-three reported, two counts are below 6,000; twenty-eight between 6,000 and 10,000; nine between 10,000 and 15,000; two between 15,000 and 20,000, and two are above 20,000. In 70 per cent. of these cases the white count was below 10,000, and it was below 15,000 in 90 per cent. The polymorphonuclear count was generally normal or slightly diminished; it was above 80 per cent. in only three cases. The mononuclear cells seem to have been quite conspicuously increased in number. They were above 4 per cent. in thirteen of the eighteen differential counts recorded, and above 8 per cent. in eight of the cases. A slight increase of the eosinophils is reported by several authors.

The Wassermann reaction is reported positive in two cases and as ± in three cases. As mentioned in connection with the consideration of pupillary reactions, the cases are here included because the clinical histories indicate that they were true cases of encephalitis with possibly coincidental syphilitic infection.

The blood cultures were negative, with the exception of one case in which the pyocyaneus was obtained.

The spinal fluid findings are reported in seventy-nine of the 100 cases analyzed. There was a slight or moderate increase in sixteen; the fluid was mentioned as cloudy in two cases. The cell count was less than 20 in forty-two cases, between 20 and 50 in eleven, between 50 and 100 in six, and above 100 in three cases. Globulin was slightly increased in seventeen, and is reported as normal in sixty-two cases. The differential count is given by Pothier [12] as all lymphocytes and mononuclear cells, with the exception of one case in which two polymorphonuclear cells are reported. Similar findings are reported by Claisse [13] and other French authors, and also by Wedgeworth and by Bassoe.[14] Wilson [15] reports one case with 90 per cent. polymorphonuclear cells, but in this case there was evidently some complication, as is evidenced by a blood count of 33,000 leukocytes with a differential count of 92 per cent. polymorphonuclears.

The Wassermann in the cerebrospinal fluid is reported as negative in all the cases where the test is mentioned, with the exception of the two cases referred to above.

The bacteriologic findings were uniformly negative with the exception of one case reported by Stafford.[16]

Termination. — Twenty-three of the cases analyzed terminated fatally; in forty-five recovery was complete, and thirteen are reported as recovering. Nineteen of the 100 cases were reported during the course of the illness and the termination is therefore not recorded. Some authors report very low mortality rates, as for example Hall,[17] who had no deaths among his sixteen cases. Abrahamson [18] reports a mortality of 10 per cent., while Wegeforth and Ayers,[19] and others, report a mortality rate of 40 per cent. or higher.

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12. Pothier, O. L.: Lethargic Encephalitis, J. A. M. A. **72**:715 (March 8) 1919.

13. Claisse, P.: Encéphalite lethargique, Bull. et mém. Soc. méd. d. hôp. de Par. **43**:222 (March 7) 1919.

14. Bassoe, P.: Epidemic Encephalitis (Nona), J. A. M. A. **72**:971 (April 5) 1919.

15. Wilson, S. A. K.: Lancet **2**:7 (July 6) 1918.

16. Stafford, C. M.: Encephalitis Lethargica, J. Lab. & Clin. Med. **4**:691 (August) 1919.

17. Hall, A. J.: Brit. M. J. **2**:461 (Oct. 26) 1918.

18. Abrahamson, I.: Epidemic Polioencephalitis, New York M. J. **110**:17 (July 5) 1919.

19. Wegeforth, P., and Ayer, J. B.: Encephalitis lethargica, J. A. M. A. **73**: 5 (July 5) 1919.

FURTHER OBSERVATIONS ON NEUROSYPHILIS AND THE PSYCHOSES *

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BOSTON

Syphilis of the nervous system has been attracting considerable attention from syphilographers of late, so much so that at the present time the journals are full of reports dealing with spinal fluid findings in cases of secondary and latent syphilis, in many cases with remarkable serologic evidence of invasion of the central nervous system with or without definite neurologic signs. Many represent latent cases of paresis or cerebrospinal syphilis, in which the invasion by spirochete and alterations in the spinal fluid occur a considerable time before we have any clinical evidence of such invasion. Cases of this type are much more frequently seen in the outpatient department of general hospitals, or in the practice of a syphilographer, than they are in nerve clinics or in the outpatient department of the psychopathic hospital. As mental symptoms are usually absent, such cases are only rarely seen in the state institutions.

On *a priori* grounds we should, I think, expect to find a great many more mental cases than we actually do, with laboratory evidence of syphilis of the nervous system and a psychosis of a type not usually associated therewith. This expectation is based on the fact that so many cases are now being reported in which, despite the absence of any clinical symptoms at all, there is laboratory evidence of invasion of the central nervous system during the secondary or somewhat later stages of syphilis. In mental cases, however, it has been amply shown in statistical and other reports on syphilis, Wassermann reactions and spinal fluid examinations, that this does not frequently occur, and we find only rarely cases that, for example, show a dementia praecox picture and have the serologic findings of neurosyphilis. That this is not due to the fact that syphilis does not occur in dementia praecox, is shown by my own observations that 5 per cent. of 240 cases of dementia praecox showed a positive Wassermann reaction in the blood serum (spinal fluid examinations negative), and this finding is amply borne out by the statistics of other observers at other institutions. Of impor-

* Contributions of the Psychopathic Hospital, Series of 1919, read at a meeting of the New England Society of Psychiatry and Neurology, March, 1919.

tance, also, is my further finding that among 1,500 nonparetic, noncerebrospinal syphilis cases admitted at Danvers State Hospital, some 7.5 per cent. gave a positive Wassermann reaction in the blood serum, but very few of these showed also any changes in the spinal fluid. Accordingly, we must adhere to the view that mental symptoms associated in a given case with signs of invasion of the central nervous system by syphilis must be attributed to the latter. If this were not true, then we should expect to find relatively large numbers of cases showing heterogeneous types of mental symptoms associated with the serologic findings of neurosyphilis, just as we now find so many cases without any symptoms whatever associated with the serology of neurosyphilis. The mechanism of the causation of these atypical cases must remain in doubt until a sufficiently large group has been collected and subjected to rigorous clinical and postmortem examinations to make the relationship clear. In some cases, granted that the association is that of cause and effect, it is fairly clear that the psychotic symptoms are the result of a particular disease agent acting on a particular type of personality.

In a paper published in 1917, I reported eleven cases of neurosyphilis showing divergence in the clinical and serologic pictures. Since that time Southard and Solomon have published a book [2] in which they have presented a considerable group of such atypical cases. Smith and I have published a paper,[3] dealing with two cases of degenerative chorea in which the serologic findings of general paresis were present, one of these having been discovered since the publication of the first paper mentioned. Myerson[4] has also presented a group of atypical cases.

Hoch[5] recently reviewed my article, pointing out that certain of the cases therein were probably examples of that type of psychosis associated with neurosyphilis, first described by Plaut and called by Kraepelin "syphilitic paranoid condition." Shortly after I published my previous paper I became aware that such a group had been described. While it is difficult to be entirely certain in the cases quoted in my earlier paper of the relationship to this group of cases, I am

1. Lowrey, L. G.: Some Observations on the Relationship Between Neurosyphilis and the Psychoses, Am. J. Insan. **74**:25 (July) 1917.

2. Southard and Solomon: Neurosyphilis, Boston, W. M. Leonard, 1917.

3. Lowrey, L. G., and Smith, C. E.: Two Cases of Chorea (Huntington's Type) with the Serology of General Paresis, Am. J. Syphilis **2**:453 (July) 1918.

4. Myerson, Abraham: Five Cases of Neurosyphilis Illustrating Special Points in Symptomatology and Course, Boston M. & S. J. **180**:499 (May) 1919.

5. Hoch, A.: Abstracts from Current Literature, Arch. Neurol. & Psychiat. **1**:642 (May) 1919.

inclined to agree with Hoch in his placing of certain cases there presented.

The cases to be presented at this time fall into certain definite groups. Group I, comprising six cases, represents a group of paranoid psychoses. Cases 1 and 2 possibly represent the above mentioned type of syphilitic paranoid, although in each case we have a history of the use of large amounts of alcohol preceding the onset of the psychosis. In Case 3 a paranoid personality seems to have developed into a mild psychotic state under the influence of neurosyphilis. Case 4 developed an interesting transformation of the personality in the midst of a typical paretic excitement, thus apparently confusing the issue with respect to the paranoid types of neurosyphilis.

Cases 5 and 6 are very obscure. In each case we deal with a paranoid condition of rather unusual type associated with serologic findings which are not conclusive evidence of neurosyphilis. The propriety of including such cases may be questioned, but since they illuminate points in connection with the discussion of the relationship between paranoid psychoses and neurosyphilis, and in connection with the diagnosis of neurosyphilis, they have been included.

In Group 2 there are five cases of the manic depressive reaction type, in Case 11 the diagnosis of neurosyphilis being uncertain. Case 10 is clearly not an association of manic depressive psychosis with neurosyphilis, but a paretic case in which intensive treatment produces remissions of an extraordinary type—justifying inclusion with the group. Group 3 contains two feebleminded cases; one with serologic findings of neurosyphilis, probably congenital; the other with serologic findings of probable neurosyphilis. Group 4 contains four cases with neither psychotic symptoms nor clinical evidence of neurosyphilis. In three cases there was conduct disorder, probably determined by so-called constitutional inferiority. In Case 16, there was an interesting increase in serologic findings under treatment.

In addition to these groups there is one case showing increase in serology during treatment, and one case, by way of contrast, of pseudoparesis.

Analysis of the clinical signs and symptoms of neurosyphilis shown in all nineteen cases, reveals the interesting fact that in only four cases could the diagnosis of neurosyphilis be made without the evidence of the lumbar puncture and Wassermann reactions. In one additional case an improper diagnosis of neurosyphilis could be refuted only by such evidence. In four cases, the clinical evidence is nil and the serologic evidence equivocal. Accordingly, of the fourteen cases of undoubted neurosyphilis here reported, only four, or 28 per cent., present clinical evidence of the syphilitic condition present. To be sure, the cases in the group are unusual from any point of view, but the

inevitable conclusion to be drawn is that any case with nervous or mental symptoms of any type may have nonsymptomatic or atypical symptomatic neurosyphilis, and all such cases should, in the absence of contraindications, receive lumbar puncture.

CASE HISTORIES

GROUP 1. PARANOID CASES

CASE 1 (File number 10847).—*Alcoholic, drug using prostitute, a victim of conjugal neurosyphilis. Psychosis characterized by auditory hallucinations, delusions, depression, hypokinesis; clearing to an hallucinated state, with defective judgment and considerable reaction to hallucinosis. Treated.*

History.—A woman, aged 34, was sent to the hospital in 1918 with the statement that for two weeks she had had delusions that men were coming up the front steps and talking about her, saying they would enter her room and kill her. The patient said she had been ill since December, gradually becoming depressed and of late had heard voices. She admitted the use of morphin, heroin and cocain for seven years, and the use of considerable quantities of alcohol for at least fifteen years. Her responses to questions were very slow; she moved very little and then very slowly. She would answer very few questions regarding her hallucinations. At times her lips would tremble, as though she were trying to speak, but words would not come. She was worried and felt depressed. She recognized the voices, but could not tell whose they were or what they said.

A history was obtained from her husband, who was recognized to be a paretic from his memory defect, speech defect and expressionless face. (Later the husband died in the hospital of paresis, having been under treatment for some months.) He said that the patient had been a prostitute since the age of 16, continuing so during her married life. They had been married for ten years, for two years of which the husband did not work. She had used alcohol for many years, going on sprees once or twice a month. He agreed that for about seven years she had used drugs. He noted the first change in the patient about Easter time, 1918, when she remained in bed one day and said she was gone, that she would not live any more, and might as well take poison. She then began saying that people had no use for her and were going to kill her. The voices would say, "She is no good, she is rotten." She had some swelling of the leg, but from this she recovered. She was blue, depressed; would sit or stand for hours and was very inactive. The husband threw away the drugs and she had had none for some time before entrance.

Examination.—Physical examination revealed nothing remarkable. The tongue and hands were slightly tremulous. The facial lines were obliterated. All reflexes were normal, including the pupils. There was marked cyanosis of the hands, with blanched nails. There was a considerable degree of pyorrhea.

Course and Treatment.—She had hallucinations, hearing voices threatening her, calling her bad names, and accusing her of all sorts of immoral practices. When she became slightly more accessible she gave a history of gonorrhea and syphilis, and admitted having had hallucinations in 1917. Her memory was only fairly good. The speech was hesitant and much retarded.

Questions frequently had to be repeated. She believed that people spied on her; published vulgar things in the paper; that they had tried to poison her. She was certain that she must die. A voice accused her of all kinds of sex perversions, which she admitted were true. She claimed to be depressed, but seemed really to be rather indifferent to her painful ideas. She did not answer the voices directly. There seemed to be blocking, especially regarding the content of her hallucinations. This condition continued for about three months, during which time she was under intensive antisyphilitic treatment. She then gradually became lively and alert, noticing everything that went on around her. She had hallucinations constantly, the voices often saying terrible things to her, many times so absurd as really to be amusing She referred her hallucinations to people who were going along the road outside the hospital. She was somewhat silly, and at times was quite elated. Occasionally she would become very profane in reaction to the voices. Very frequently she would suddenly remark, "It is not true, doctor, what they say about me; I didn't do that," indicating that the voices did not talk to her directly, but talked about her. She had some insight into her past condition, but thought she was well at the time. In the later months, there were no longer any tremors or any cyanosis.

She was eventually transferred to the Boston State Hospital where she now is. Active hallucinosis has continued, despite treatment.

At the time of admission the Wassermann tests on blood and spinal fluid were positive. In the spinal fluid the protein was increased; there were sixteen cells, and a gold reading 5554444322. There were tremors of the hands and facial muscles, and an ironed-out expression. These latter symptoms, plus the serologic findings, were the only positive symptoms of syphilis of the nervous system. The other symptoms were more typically those of an alcoholic hallucinosis, or of dementia praecox, and in the absence of serologic findings the differential diagnosis between these two would be very difficult. A recent spinal fluid examination showed a lessening in the intensity of the reaction.

CASE 2 (File number 13430).—*An alcoholic man, aged 36; acquired syphilis eighteen months ago; vigorous treatment. Psychosis characterized by vivid, threatening auditory hallucinosis with delusions of persecution. Wassermann reaction on blood and spinal fluid, negative. Serology otherwise typical. Treatment—recovery from the psychotic state in a few weeks.*

History.—The patient, a man of Irish descent, was brought to the hospital by the police, with the statement that he had been bothered by the influence of neighbors, who had some sort of an instrument by which they could read his thoughts, control him so he could not talk, etc. This instrument enabled them to see right through the walls. He stated that this had been going on for six months. He seemed quite concerned about his persecutions. His emotional tone was in accord with the delusional content. He was accessible and cooperative, with no memory loss. He said, "I can't dope it out. I know it sounds like a crazy man, but these people can make a suggestion and

then make me carry it out. When I was in Maine they had me in a hypnotic trance."

History obtained from the wife revealed nothing of importance in the family history. The patient had had some education, and later became a bartender, at which business he had worked until about five years ago, when he became an advertising solicitor. He had been married for thirteen years. His wife, during the past seven or eight years, had worked in order to help support the family. She stated that he had always been jealous, although she gave no cause. He had a cheerful, easy-going disposition, was good-natured, generous, thoughtful, proud, did not like criticism. He read a great deal. Although he was ambitious, he never realized his ambitions. He had always drank a little, but more during the past winter, when he would become intoxicated. He stopped drinking May 1. He turned against his wife last spring and has had no marital relations since. He became irritable.

In July, he first stated that people were after him, and since that time he had complained of delusions of persecution. He finally refused to speak to any of the neighbors, thinking they were hired to annoy him. At times he thought that his wife was behind the plot. Once he threatened to kill his wife, his son and himself, but made no attempt. For about two weeks he smiled to himself, and his lips moved as though he were talking. He would start to answer questions and then hesitate. He complained of pain in his head.

On the day of admission he was yelling, saying that the roof of his head was going.

The patient himself gave a history of excessive alcoholism extending over a period of several years, and a definite history of a primary syphilitic lesion a year and a half before. He received active antisyphilitic treatment at a general hospital. The Wassermann reaction became negative and remained so.

On mental examination, he was oriented and there was no history of disorder of consciousness. There was no obvious disintegration of the personality; no memory loss. The emotional tone seemed quite in keeping with the delusional content. He was worried because of the persecutions. He claimed to feel depressed, and had outbursts of irritability against people who he thought might be in league with his persecutors. His hallucinations and delusions commenced six or seven months before entrance, following a spiritualistic seance which he attended in May. His hallucinations were auditory; the phonemeta were about him, referring to him in the third person, but occasionally the voices talked to him directly. They were chiefly catholics. What the ultimate motive was, he could not determine. They had some sort of an electro-magnetic machine which effected him through sound waves. The persecutors could control his thoughts and every activity. His will was under their complete domination. He was quite accessible and cooperative, and showed no conduct disorder. He was normally active, and there was no disorder of thinking.

Examination.—On physical examination, he was found to be well developed and well nourished. The pupils were equal, regular in outline, and reacted normally to light and accommodation. All deep reflexes were present and brisk. There were no abnormal reflexes. General visceral systems normal. The Wassermann reactions on the blood and spinal fluid were negative to several tests. Spinal fluid showed protein increase, 8 cells, and a gold reading 5555321000.

Course and Treatment.—Within six weeks of his admission, the patient had entirely recovered from his psychosis. He stated that his past experience had been a vivid dream, and claimed that the voices he heard and the ideas of persecution were all due to his imagination. He was pleasant and agreeable, quite tractable. He worked well and assisted with the general work around the hospital.

He had, in the meantime, received very vigorous intravenous and intraspinal treatment and at the end of six weeks was allowed to go home on a visit, where he still is, getting along quite well.

Without the complication of neurosyphilis, this would be regarded as a case of acute alcoholic hallucinosis. The patient's history of having used alcohol excessively up to a quart of hard liquors a day, combined with the onset of the psychosis shortly following the time when he stopped drinking, as well as the clinical characteristics of the psychosis, would all indicate this diagnosis. The ideas of influence, however, and of control were unusually marked for an alcoholic hallucinosis case. It should be noted that the syphilitic paranoid conditions are very closely allied in symptomatology to alcoholic hallucinosis, and that in both disorders we have to do with an active hallucinosis on which are founded delusions. Of course, in this case the diagnosis of neurosyphilis would be equivocal were it not for the clean-cut history of a primary lesion from a general hospital with resulting treatment, which produced a negative Wassermann reaction.

This case also emphasizes a point for the syphilographers, namely, that a negative Wassermann reaction in the blood serum is not always evidence of a thorough cleaning up of the syphilitic infection. As will be shown in another case, the negative Wassermann reaction in the blood serum may persist for a long period during which the spinal fluid findings are positive and may even become more marked. It may be noted here that the writer has had personal experience with one case in which the blood and spinal fluid Wassermann tests were persistently negative over a period of three years, although all the other spinal fluid findings were positive and the case was typically paretic from a clinical point of view. Eventually, under intraspinal treatment, the spinal fluid Wassermann test became faintly positive.

CASE 3 (File number 10373).—*A man, aged 42, of paranoid personality, with syphilis possibly four years previously, became quite suspicious and mildly psychotic. Improvement under treatment.*

History.—This man was referred to us from a general hospital because of certain paranoid ideas, together with a positive history of syphilis, leading them to suspect syphilis of the nervous system. In 1898 the patient's right eye was injured by the explosion of a fire-cracker. In 1906 he had been operated for double hernia and appendicitis. In February, 1916, he fell from a platform and injured his back. Roentgenograms taken at a general hospital led to the patient's being told that he had a slight fracture of the

fifth lumbar vertebra. In 1915 he had gone to a general hospital for a sore throat and a sore on his right shin. A positive Wassermann reaction was found, and he received five doses of arsphenamin. At the time of entrance, March 14, 1918, the patient complained that his back and left arm felt numb, and that he was troubled with headache.

The mental examination showed that the patient was clearly accessible. He gave a good history of his family and of his own life. He had worked in an express office for many years, remaining twenty years in one office. He remained there so long because he lived with his mother and did not care to leave her. From 1911 to 1913 the catholics in this town were against him because he was a mason, and tried to run him out of town. He thinks they eventually succeeded in ruining his business, so he came to Massachusetts in 1913, and took a place in Boston in an express office. Here the men in the office soon began to make him the butt of their jokes and they began to do many things which irritated the patient: they would throw things at him and would take his chair from under him. More annoying even than this was the way in which they would change chairs for him. When he was out his chair would be taken and another one substituted. Many things of this sort were done, and he believes they talked about him and reported him to the foreman. He was quite circumstantial in telling this story. No disorder of articulation or of emotions appeared. He was quiet and cooperative. He described himself as having always been social, not seclusive or shy, easily angered, always the butt of jokes.

Examination.—His headaches, backaches, numbness and pains in his legs continued, and the physical examination showed an injured eye, a small mass in the occipital muscles, a stiff lumbar spine without curvature, without any pathology in the neurologic condition. The urine was negative. The spinal fluid showed globulin 1, albumin 2, gold 0012333100. The Wassermann reaction on the serum was positive, on the spinal fluid negative.

The patient has since been under treatment with improvement in the serologic findings. He has frequently visited me to talk about his complaints of one sort or other, usually physical, and has manifested a great deal of interest in the state of his health. He always asks for diet lists, and as to the advisability of his doing various things which he feels might in some way impair his health. To some extent the petty persecutions in the office have stopped. Whether this represents a lessening of the very mild paranoid strain, I cannot say. He is apparently not quite so suspicious of people as formerly, for when he was in the hospital he was definitely suspicious of many people whom he saw.

This case possibly represents a very mild type of the syphilitic paranoid condition described by Kraepelin, in which, however, hallucinations are absent.

CASE 4 (File number 11177).—*Typical case of general paresis, developing marked auditory hallucinosis and transformation of the personality.*

This case differs from the others in that this man presented all of the clinical symptoms of general paresis, including Argyll Robertson pupils, hyperactive deep reflexes, slight speech defect, defect in calculation ability, judgment defect in practical matters, ideas of grandeur, restlessness and memory defect, together with the following serologic findings: Wassermann reaction, blood and spinal fluid, positive; protein increase, 12 cells and a gold reading 5555444321

Why then should such a typical case of general paresis be presented in a series such as this? For the following reasons: At the time of his first admission in August there were no hallucinations and had been none. He was out for four days on a visit in October, during which time his behavior was typically that of a grandiose paretic, and shortly after his return he became more and more restless, irritable and even violent, and about this period became actively hallucinated. He heard God's voice telling him that the physicians and nurses were to be killed. He also heard the voice of Jesus Christ and carried on long conversations with God and Christ somewhat later. The hallucinations continued, and he became convinced that he was Jesus Christ and damned everyone in his vicinity to hell, and later still came the idea, of variable intensity, that he was God. From the time of his admission on he had been under intensive treatment, and at one time developed a jaundice which interfered with the treatment for some weeks, during which period he became hallucinated. During all of this excitement and great expansion of the personality he still recognized those about him.

I cite this case because of its importance as showing that hallucinations can and do exist in general paresis, and that delusions, based thereon, may also occur; in addition to its bearing on the general question of the causal relationship between neurosyphilis and paranoid states, where the two co-exist. *If such a state as this may occur in otherwise typical paresis, then obviously neurosyphilis should be able to produce such a state without concomitant distinct signs of paresis.*

CASE 5 (File number 13364).—*A school teacher, aged 49, always queer, with a love fantasy dating back twenty years, and a paranoid psychosis of some years' duration, showing a curvature of the spine, possibly tuberculous in origin, with equivocal spinal fluid findings.*

History.—The patient was sent in by order of the court for observation. At the time of admission she was mildly excited by the experience, but showed an intelligent understanding of the situation. She stated she had had two operations within two months, and three days before had left a convalescent home. She denied any ideas of reference, delusions of all kinds and hallucinations. There was no dizziness, headaches or seizures. She was a teacher, lived alone, and for the last twenty years had worked irregularly.

Outside history was obtained with some difficulty, but it appeared that for many years she had been kept on the list of substitute teachers, because her

work was not very satisfactory and she was hard to deal with. She was always dissatisfied with the way she was treated, and was antagonistic toward the children. In high school, the patient had been regarded as rather stupid, quiet and a little odd. She had taught school regularly for six years, and then as a substitute for twenty years. When she stopped her regular work, twenty years before, she ordered a trousseau from one of the stores and announced that she was going to marry a physician, who had never heard of her. Since that time she had been regarded as queer, but no one had thought that she had especially deteriorated. She had been known for rather queer religious beliefs, and for belief in spiritualism, and had told of visions and of illuminated pictures, but did not mention voices.

Twenty years ago she was at the Boston State Hospital for ten weeks, where a diagnosis of hebephrenia was made.

Examination. — On mental examination, the patient was courteous, very cooperative, but not freely accessible regarding her delusional ideas, which she tended to regard as sacred. From her, we learned that she was an illegitimate child, that she was cared for by her maternal grandparents until the age of 5, when an aunt by marriage took her and abused and mistreated her. She was then taken by some people who became her foster parents. She really knows very little of her family. As a child she was happy. She went through normal school. Her memory, in general, was good. School knowledge was well retained. Although she had taught for many years, she found it rather hard as the discipline was difficult for her. She regarded herself as a recluse. Diffident and bashful as a girl, easily embarrassed, she made very few friends. She did not mix well. She never cared for ordinary amusements; had never gone to shows or theaters; did not care for dancing, cards or sports of any kind. She called herself a bookworm. She usually read books on sociology and religion. She had never been subject to blue or depressed periods, and was not quick tempered. She was brought up a Baptist, but had changed her religious views since.

At about the age of 12 it was noticed that she had a curvature of the spine. At 14 a plaster cast was applied, and she wore it about three months. Later she had a support and a shoulder brace, which she had worn most of the time since. Eight years ago a small tumor was removed from the right breast. Six weeks ago another tumor was removed, and later, because of excessive menstruation, a curettage was done. She insisted strongly on returning home, and did so. The doctors visited her at her home and sent her here for observation.

The central feature of the case was a delusional idea which the patient gave up with much reluctance. She insisted that the examiner and every one in the universe knew about that with which she had to contend. If the examiner did not know, then she did not know and the whole thing would be imaginary. Twenty years ago something took hold of her and she knew she was loved. She had a wedding dress made, and mentioned having her name changed, and ever since then she had been influenced and had known that she was loved. This kept her from holding positions in the schools, and so influenced the pupils that their behavior was bad and she could not discipline them. This caused her all the misfortune and sorrow she had had, the climax being reached when she was sent to the psychopathic hospital. During the past two years this person had come to her every night and had had sexual intercourse. She enjoyed it, yet she worried about it because she was not sure that she was doing right. If she were in a repellant state of mind, he did not come.

Up to the age of 14 the patient performed masturbation, having been taught improper actions at the age of 5 by a boy. She overcame this and had not performed masturbation since. The patient would like to have married, and would like to have had a family. She thought that she was always hypersexual when around men. She felt that every one knew this. People looked at her on the street and noticed her. She could not give any reason as to why she thought this was known. She supposed there had been mention of it in the newspapers. She knew where the daughter of the man lived, but would not tell. Aside from this, no delusions were determined; nor was there any certain hallucinosis. She had a religion all her own. Her left hand was consecrated. The thumb signified the right spirit; the finger the right mind; the next the right body and environment; the next her relation with the Supreme Being and others; and the next the right consciousness. The right hand was named "service." The thumb indicated the spirit world. The fingers were called the family. She prayed according to the way she had named her hands. She was a socialist, and believed in spiritualism to a certain extent. She showed no disorder in thinking.

On physical examination she showed some dulness in the lungs; a right upper thoracic scoliosis. Neurologic examination was entirely negative. The blood and spinal fluid gave a negative Wassermann reaction. The spinal fluid showed increased protein, 3 cells, and a gold reading 5555511100.

Here, then, we have a patient always seclusive and odd with a definite sense of inferiority, due to the fact that she was an illegitimate child, with a diagnosis of hebephrenia twenty years ago at a State Hospital. She had scoliosis and possible tuberculosis of the lungs. She was sent to the psychopathic hospital because of delusions, chiefly of a sexual nature and of a spiritual lover. The Wassermann reactions were negative, but there was a typical paretic gold curve and an increase in the protein content. The cause for the spinal fluid findings is obscure, and the relationship between these findings and the psychosis is still more obscure. The chances are, of course, that there is no relationship, and that the organic disease indicated by the spinal fluid findings has yet to produce symptoms.

How are the spinal fluid findings to be explained? The positive findings were: albumin and globulin increase and the gold reaction. In the absence of clinical signs to aid us, we can only say that such findings indicate an inflammatory reaction in the nervous system. Such a gold curve is often regarded as typical for paresis, but this is not invariably true. While a negative Wassermann reaction in the blood and spinal fluid are not conclusive evidence against syphilis or paresis, it is a very rare finding. Furthermore, provocative arsphenamin injections produced no change in these reactions. Under the circumstances, we can only record the case and await developments.

CASE 6 (File number 12636).—*A single woman, aged 51, apparently always reserved, and possibly somewhat peculiar, with some character change and economic failure four years previously. Psy-*

chosis very mild in type, characterized by probable auditory hallucinosis, and some delusional formation based on that. Patient anemic. Slight spinal fluid changes, probably not neurosyphilitic, but origin uncertain. Rapid improvement in mental condition. Discharge. No antisyphilitic treatment.

History.—The patient was admitted to the hospital with the statement that for six weeks she had had delusions of persecution and auditory hallucinations. She believed that the instigators were people who lived above her, who wished her room for a friend, and that the landlady was also involved. She called in a priest the night before to rid her room of devils that infected it. She wandered about during the night disturbing the house and did considerable screaming as though frightened.

On admission she was quiet, accessible, cooperative; approximately oriented as to place. She talked fairly clearly.

The history was obtained from a niece, who had heard from her mother that the patient had always been queer. She was constantly irritable, and after knowing persons a week or two would imagine that they were conniving things against her. She was never good natured or happy; she was melancholy and thought of unpleasant things. She was a malicious gossip, telling untruthful, slanderous tales about people she knew, saying that the women went with men immorally, etc. She had a vicious temper. Eight years ago she bent her sister's back across a railing almost injuring her. She was said to be very untruthful and jealous. She went to the theater and read love stories constantly. She was usually very haughty with men, but had had a mild love affair years ago. She had no friends and hated the world. This niece was the only person with whom she could get along, and of whom she was fond, although the patient also slandered the niece.

The patient had apparently led an uneventful life as a saleswoman until four years ago, when she was said to have given up work, hung around the house, worried continually about her physical condition, and saw many physicians. These found nothing wrong, except that she was anemic. Two years ago she had a peculiar spell of short duration and then became more queer than ever; she neglected her house and lost interest in everything. She would sit shaking her head and thinking for a long time; began to talk in a slow, drawling way, and became pale and thin. Often she would not answer questions, and would laugh in a silly way over things that were serious. She said that people were calling her names. She showed no fear, and gave no explanation for the voices. She was naturally reticent and seldom explained her thoughts. She said the people upstairs were peeping down on her, that men were going in her window and were under her bed. She continued to gossip and make trouble, and would write letters to do so. She once threatened her aunt, saying she would shoot her.

For about three weeks the patient had been eating very little and probably not sleeping much. She had become very thin. A day or so before admission she said a 21 year old boy who lived in the same house that she did had promised to marry her. She ran after him, so that he refused to come back to the house.

There was no history of fainting attacks, convulsions or shocks. Memory was unimpaired. No dizzy spells or headaches; no periods of confusion had been experienced. For two years she had thought that men looked at her on

the street because she was so good-looking. It was said that shortly before admission she talked a great deal about the devil; ran up and down the steps with no clothes on, and did a lot of silly talking. A doctor was called and she was brought to the Boston State Hospital.

Examination.—The patient denied the majority of the statements given in the outside history, and those she admitted she explained away. She was sure that she had been quite nervous recently, and that this began from sheer hunger because she had no money. She denied the love affair with the boy. She said that she had commented on his good manner and on his studious habits. She told of a love affair at 22, with a man who deceived and wronged her, and then deserted her. It was not possible to get any slanderous remarks from her about any of the neighbors. She admitted that she heard the people upstairs talking about her, saying they wanted to get her out, calling her names, stamping on the floor so as to make it uncomfortable for her; also that she called the priest to bless her room, thinking it might be devils, but before she was discharged from the hospital she insisted that she was sure there were no devils there. She was at all times quiet, pleasant and agreeable, accessible, courteous. She gave no evidence of hallucinations while in the hospital, and no further evidence of delusion formation.

She was pale. The pupils were thought to react less well to light than to distance, but they apparently reacted normally to both. The heart was enlarged on the left side, and the sounds were weak. The pulse was bigeminal; blood pressure: systolic, 105; diastolic, 70; hemoglobin, 90 per cent. The differential count showed 5 per cent. of eosinophils, otherwise it was negative. Urine findings were negative. Spinal fluid globulin 1, albumin 1, cells 2, gold 0000111000.

It is to be noted that in this case there are two conflicting points of view. First, there is the view of the patient's relatives that she has always been queer, and that for four years there has been a distinct change in character, even more marked during the last two years; and, according to the account of the people where she lived, a definite exacerbation during the three weeks preceding admission, with a crisis the night before. A history of this type is, of course, not uncommon in the paranoid psychoses. On the other hand, there is the patient's denial of practically everything attributed to her, although it must be noted that her explanation for the things she admits is practically always inadequate. The acute episode could equally well be explained on the basis of exhaustion from prolonged undernourishment and anemia. The spinal fluid findings were not marked, but they were definite. Of course, protein increase in the spinal fluid occurs in a wide variety of conditions in which there is some disintegration of nervous tissues. The majority of such cases at this age are syphilitic, neoplastic or vascular in origin. In this case there was no evidence of any one of these three causes, aside from the spinal fluid changes themselves. With the Wassermann reactions on the spinal fluid and blood negative, little stress would be laid on these changes, were it not for the fact that occasional cases are seen in which findings of this type are the first indication of neurosyphilis, the spinal fluid findings

later becoming more definitely positive and the Wassermann reaction showing positive instead of negative results.

GROUP 2. CYCLOTHYMIC CASES

CASE 7 (File number 9391).—*Man, aged 42, physical and serologic signs of neurosyphilis, psychosis of manic depressive type. Recovery from psychosis.*

History.—This man entered the hospital Sept. 16, 1917. The family history was negative, except for one sister who had had, about 1907, an attack of depression in which she had hallucinations, had ideas of persecution and poisoning and refused to eat. She was at the Worcester State Hospital two years, and following discharge recovery seems to have been complete.

The patient had a normal childhood. He became a lithographer and for twenty years had conducted a prosperous business of his own. He was married in 1907. His wife died following the birth of the first child. He had never been sick. About seventeen years ago he had had a sore on the penis. He had not been a drinker. He had suffered somewhat from a chronic intestinal disorder, and about two months before admission to the Boston State Hospital he went to a general hospital, where, during the routine examination, his blood Wassermann reaction was found to be positive. About three weeks before admission the patient became very much depressed. He kept repeating that he was gone, was no use to the world, etc. He accused himself of being sinful, and said that other members of the family would be lost because of what he had done, that he had disgraced the family by sexual offenses. He was sent to a sanatorium, gradually grew worse and became so markedly agitated that he was removed to the psychopathic hospital.

Examination.—Here, he was clearly conscious, oriented and his memory good. He was markedly self accusatory, and feared that he was to be executed because of his misconduct. Attention was maintained with difficulty. Flow of thought was very slow, and there was a good deal of retardation. He was much depressed, anxious and agitated.

On physical examination, the heart and lungs were found to be normal. The pupils were slightly irregular; the left reacted sluggishly, the right was stiff to light. Knee jerks and ankle jerks were not obtained. There was paresthesia of left leg; fine tremor of the tongue and fingers, and a suggestion of ataxia in his gait. The spinal fluid showed globulin, 3, albumin 3, cells 9, gold 5555533331. The Wassermann reaction on the serum and spinal fluid was positive. He was put under intensive treatment. He continued to be depressed and agitated, moaning and groaning. He was markedly retarded. In July, 1918, he was transferred to the hospital department, and since has been released on visit in a much improved condition. Since his release he had been doing some painting and has improved markedly so far as the mental symptoms are concerned.

It will be noted that he showed physical signs of syphilis of the nervous system, but none of the cardinal mental signs in the way of memory defect, loss of reasoning power, of calculating ability, etc. It was rather a fairly typical picture of a mixed manic depressive phase. Presumably in time the patient will develop further symptoms of paresis, but for the present it is not possible to say more than that he

showed, in the presence of some physical and laboratory signs of syphilis of the nervous system, a psychosis of distinctly nonrelated type.

CASE 8 (File number 12482).—*Acute maniacal outbreak in a German naval officer with confusion and disorientation. No neurologic signs of paresis aside from slight tremor; good memory; grandiose and euphoric in the most excited stage; recovery from the outbreak in about eight days. Serology of neurosyphilis.*

History.—The patient was a German officer assigned to a ship transferred to the United States for use as a troop ship. Enroute to Boston from Europe, he became violent, attempted to stop the ship so that he could take a swim, and started a fire in his cabin which threatened to burn up the ship. He was so violent that he was unmanageable at the Naval Hospital and was admitted here in irons, talking, gesticulating, spitting in the attendant's face, and struggling to get free. He was disoriented, incoherent, spoke poor English in a harsh voice and was markedly active. During the first three days he was noncooperative, excited, talkative, incoherent and rather playful. In this phase he gave his name, age and address correctly, and varied his statement of where he was according to his immediate environment. When in the prolonged baths he said that he was in a submarine. He quieted down rapidly and on the fourth day he was very friendly, was oriented, very observing, would mimic the other patients, was very gracious in his manner, quite talkative and humoristic. Within eight days of admission he seemed to be in a quite normal condition. He gave a good history of himself and of his past. Retention of school knowledge was very good. He could give a good account of the war. He was somewhat alcoholic, but not more so than is usual.

At the age of 17 he had a genital lesion for which he received no treatment. In 1915 he had another genital lesion which lasted three weeks. On this occasion he was treated by a syphilographer at the naval hospital in Kiel. He was given four courses of treatment, each consisting of six intravenous injections of arsphenamin and six intramuscular injections of mercury. He received no further treatment. He stated that he was all right when he left Brest. His trouble arose when about three days out. He believed that the chief officer, under whose direction he was on the boat, did not understand him and so made some trouble for him and reprimanded him on two or three occasions. (It is possible he was somewhat too active and this was the cause of the reprimand.) He could not give a clear story of all the events that happened. He denied attempting to stop the boat and to go swimming. He explained the fire incident by saying that he had cut an electric wire in the cabin in order to light a cigaret, as he did not have any matches, and by rubbing the two cut ends together he made sparks with which he lighted a piece of paper and in that way lighted his cigaret, and in this way, also, the small fire started. At this time he seemed to have no particular delusions, although a day or so later he stated that he was going to return to Germany and purchase a boat with which he would make considerable sums of money. The boat could be bought for perhaps 200,000 marks. He had no money himself, but he was sure that because of his ability he could borrow the money from bankers. He realized that he had had an attack of mental trouble, and probably at the time of discharge was still slightly euphoric. There was at no time any emotional instability. At first his attention was quite distractible,

but later it became normal. Where he had shown flight of ideas in his more violent phase, his ideation became of normal range, as did his motor activity.

Examination.—Physically he showed numerous small scars from acne all over the body, a slight tremor of tongue and extended fingers, a slight swaying in Romberg's position. The knee jerks were equal and within normal range. The pupils reacted to light and distance, and were described differently at different times. They were equal, were said at one time to react sluggishly to light, the right better than the left; consensual reaction was present in both; they both reacted to accommodation. He seemed to have no speech defect on either English or German test phrases. The physical examination was otherwise negative. The Wassermann reaction on the serum was positive; on the spinal fluid, at the first test, it was negative, but the second test was positive. The spinal fluid showed globulin 1, albumin 1, 255 cells, including small and large lymphocytes, endothelial cells, polymorphonuclear and plasma cells, a gold reading 5555543330. A second spinal fluid showed more intense reactions in the protein test, 248 cells, and a gold reading essentially the same as before.

This case presents an acute maniacal outbreak characterized by violence and clouding of consciousness, together with many of the cardinal signs of mania, but coming on more rapidly and clearing up much more rapidly after a shorter duration of attack than is true for a manic depressive psychosis. There were no cardinal signs of general paresis in any of the phases. The gold reaction, of course, was typically paretic. The high cell count is of equivocal value, but it is usually considered to point more in the direction of a cerebrospinal syphilis of the meningeal type than in the direction of general paresis. It is difficult, therefore, to say whether we were dealing with a spontaneous remission of remarkable type in a case of a general paresis, with an acute delirium associated chiefly with a meningeal type of neurosyphilis, or, indeed, with an association of an atypical sort of mania with neurosyphilis. In any case, it is probable that the causative factor was the neurosyphilis, and that treatment had to be directed toward clearing this up. The prognosis in the meningeal types is much more favorable than in the paretic type.

CASE 9 (File number 12862).—*Acute maniacal attack with hallucinations and delusions in a man, aged 43. No clinical evidence of neurosyphilis. Serology positive. Rapid recovery.*

History.—A Portuguese was brought to the hospital by the police on July 2, 1919, with the statement that he had been normal until the day before, when he became talkative, flighty and incoherent. He appealed to God, got down on his knees and crossed himself.

When seen in the ward, he was oriented, talkative, active; consciousness was entirely clear. He dwelt on a back injury, the fact that he was dirty, that God was going to aid him. God neither spoke to him nor put thoughts in his head. No ideas of grandeur were elicited, although he was euphoric. He denied that there was any trouble with his mind. He was easily managed and cooperated willingly.

Mental examination revealed no memory defect. The family history, as he gave it and as it was given by his brother, was negative. His personal history agreed with the history given by his brother. He had always been quite conscientious and obstinate. About two years before admission he injured his back. Following that he was greatly worried by the pain in his back, his inability to work, and the difficulties he had in endeavoring to secure compensation.

There had never been any mental symptoms until on the night of June 30, when he entered his cousin's bedroom about 11 o'clock, saying "I want you to go to church with me tomorrow at 10 o'clock to prove I am a true man of God." He was put to bed, but an hour later he partially dressed and ran into the street, crying "Mother, Father," then dropped to his knees, and began to pray and talked incoherently. He was brought into the house and to his room. He immediately upset all of the furniture, and began to mop the floor and wash the windows. During the rest of the night he was constantly in motion, repeating, "Man has deceived me, I believe only in God." He continued this way all next day, constantly active and restless. He could be persuaded to lie down, but would immediately jump up. On the morning of July 2 he locked himself in the bathroom and refused to open the door unless his cousin would knock on it three times and call his name three times. About six months prior to this he had complained to his cousin that he had lost all sexual power and desire. This was the only prodromal symptom obtained.

Examination.—Physical examination was practically negative. There was no evidence of any disturbance of nerve functions, so that whatever the injury to his back may have been it had not resulted in any definite organic lesion. The reflexes were all normal. The pupils were equal, circular, eccentric in position and reacted promptly to light and distance. Physical examination was otherwise negative, including the sacro-iliac joints. The urine was normal.

Mental examination revealed that he appeared to tire easily, and at times would not make the mental effort necessary to fix the date of an occurrence. At times he would become a trifle confused and speak about "God not wanting to kill anybody." He was completely oriented. He was continually interspersing his answers to questions with irrelevant remarks, such as, "Believe only in one God, that is all." Some of his remarks indicated the possibility of ideas of persecution, as "I cry all day and all night to go out with the good people. I appreciate, try to mind all people, but some people try to make bad out of you." When asked if any one had been trying to hurt him, he replied, "My feelings cannot be hurt out of any one. If you punch in my jaw two or three times, that's your chance, I don't care."

He gave a good and coherent account of his past life with the exception of such remarks as were interjected. He gave a history of sexual promiscuity until after his accident. He found that erections produced so much pain in his back that intercourse was impossible. He gave a good history of the accident, the compensation and his difficulties following that. There was no insight into his mental state. He admitted auditory hallucinations and some visual hallucinations. At times he was somewhat agitated, but, on the whole, he was rather indifferent. His activity was fairly normal while here, although there was a definite history of a pressure of activity. His mental condition improved markedly, so that by the fifth day he seemed entirely clear. He remembered the things he had done, but he could not account for them and was not certain of all of the details. He said, "It came so strong on my head it pulled me up and down the street, pull me this way, that way, make my head

so big I feel like I go crazy." He did not speak of God, or "being a good man to God any more."

Because of his marked improvement, he was discharged to the family instead of being committed.

The serologic examination showed Wassermann reaction positive in blood and spinal fluid; globulin 1; albumin 1; gold 1134400000; 166 cells.

We have here to do with an acute maniacal outbreak, showing some hallucinations and possibly delusions of a religious nature, associated with syphilis of the nervous system, with quite rapid improvement under hospital care. Further outbreaks probably of the same nature are to be anticipated. The duration of the neurosyphilis is questionable, but certainly it must antedate by a considerable period this outbreak.

CASE 10 (File numbers 7724, 8514, 8563).—*Tabetic fireman, aged 38, with three attacks of grandiose mania, in which the paretic picture is typical. Intensive treatment; remissions with almost complete recovery, good insight and practical judgment, slight memory loss.*

History.—This patient was first admitted to the hospital Nov. 23, 1916, aged 38. He came voluntarily from a general hospital, following a suggestion that he take treatment in our syphilitic clinic. At this admission the patient was perfectly oriented. He said that his memory was not so good as it had been, although he gave a good, coherent account of his life and occupation. He gave a history of syphilitic infection in 1910, with treatment of mercurial inunctions for a period of two years. Other than that his past history had been essentially negative, except for some nervousness, irregular hours, and a good deal of exposure to the weather while attending fires. For about four years, namely, since 1912, he had had some difficulty in keeping his balance, and had had shooting pains in his legs. At this time he showed a little speech defect and sometimes repeated words. His school knowledge was well retained, and his calculating ability was good. His writing showed no tremor. Conduct was normal, and he cooperated well.

Examination.—Neurologic examination showed that the pupils were stiff; knee jerks and achilles jerks were absent; Romberg's sign was positive; the gait was markedly ataxic, and tests of the lower extremities showed poor coordination. The Wassermann reaction on the serum and on the spinal fluid was positive. The spinal fluid showed globulin 4, albumin 4, cells 41, gold 5555443100.

Course and Treatment.—He was discharged to the outpatient department and was under treatment there, and during this period worked, attending several large fires. About April 24, he became overactive, planning big schemes, involving fire protection for a large number of adjacent towns. He was restless, sleepless, talkative, quite euphoric. On admission he was perfectly oriented, repeated test phrases well, showed absent knee jerks and positive Romberg's sign. At this time a history of syphilis in 1889 was obtained, together with symptoms of tabes as long as ten years prior to admission, that is in 1907. These symptoms of tabes were given by the physician who had been treating him. He continued to be restless, very talkative, and had a large scheme for extending the service. There were pressure of speech and activity,

some speech defect, but memory fairly well retained. Shortly thereafter the patient became very ill. He was restless, very talkative, confused, with generalized, marked tremor. He gave the month as the 4th of July, the day of the month as Friday the 16th, when it was neither. He said that he had had syphilis in 1819. He was now 38, born in 1917. The year was 1911. Asked how long he had been here he said "36 years of age." His speech was extremely disordered, and it was difficult to understand many of his words. He was put on the danger list, and it was felt that the end was rapidly approaching. However, he was given an intraventricular treatment and began to improve. He improved slowly, became quite rational and had insight into the attack through which he had passed. He realized that he had been out of his head. July 12, 1917, he was allowed to go on visit, returning June 17, 1918. He was euphoric, emotionally unstable, cried easily, with a vague feeling that he had been mistreated; he was quite excited, restless and circumstantial with a marked pressure of speech. He was rather grandiose, more or less disturbed, and continued so for about six weeks. He then began to quiet down and showed signs of deterioration, which have persisted to the present time, although there has been no further attack of excitement.

This case shows, under the influence of treatment, very remarkable remissions, resembling the remission of manic depressive psychosis, in which all symptoms except a slight deterioration disappear, and extremely good insight is attained.

CASE 11 (File number 12861).—*Boy, aged 21. He had three attacks of maniacal type: serologic findings of probable early neurosyphilis.*

History.—This patient was sent to the hospital July 2, 1919, having been arrested in a neighboring city the night before when asleep on a bench. It was discovered that he had formerly been at this hospital, and at Taunton State Hospital, so he was returned to this hospital.

On admission he showed increased psychomotor activity, talkativeness, suspiciousness, and was somewhat resistive. In the ward he was accessible and cooperative, talkative, hyperactive, happy; quite circumstantial in his answers to questions. He was correctly oriented, and had a very good memory.

Examination.—Mental examination revealed some characteristics of mania, with the addition that he was quite critical and somewhat suspicious and slightly evasive. He was distractible, overactive, and showed a small range of ideas; he was elated and somewhat grandiose. No history of syphilis was obtained.

The physical examination was negative. The Wassermann reaction on serum was negative. The spinal fluid showed 14 cells, and a gold reading 1233100000.

Here is a patient with a history of two previous attacks of manic depressive psychosis, and at present slight alternations in the spinal fluid which are difficult to explain. It would be very important to know whether the positive fluid findings antedated his earlier attacks.

In the absence of any positive information, it becomes important to follow the case to determine whether eventually the attacks change in type.

GROUP 3. HYPOPHRENIC CASES

CASE 12 (File number 12802).—*A feebleminded woman, aged 30, without clinical signs of neurosyphilis; positive serology — congenital?*

History.—The patient, a hunch-back dwarf, was arrested for vagrancy and for sleeping on the Boston Common, which she says is "good for anyone." When asked why she was brought here, she said, "For drinking, I suppose." Why do you drink? "Why, because I like it, and when I like a thing I like it and I am not going to change no matter how many doctors is about. I have got a room and I don't bother nobody." She said a man was going to marry her; she had no other friend. She had one sister in the Boston State Hospital. Her father was said to be in the Long Island Hospital. Her sister was committed to the Boston State Hospital in October, 1918, with the diagnosis of dementia praecox, so that practically nothing could be learned about the patient's past, except what she gave herself.

Examination.—The patient was accessible, talkative, rather sullen at times, poorly oriented without marked impairment of memory, but unable to give details accurately, with no school knowledge, saying she was in the fourth reader when she left school. She had a very meager range of ideas; her fund of knowledge was extremely limited. The patient was markedly restless at times, quite circumstantial and talkative when once started.

There was a dorsal kyphosis with pigeon breast. The pupils reacted poorly to light, well to distance. Neurologic findings otherwise were negative. Wassermann reaction on the serum and spinal fluid positive; globulin 0; albumin 1; cells 20; gold 0012332100.

The mental level was 6.8. The patient was cooperative.

From the patient's account of her own life, her poor retention of school knowledge, her limited fund of general information, and her general temperament, it seems quite clear that the mental age represents the highest the patient has attained. In addition, there is neurosyphilis, the origin of which is distinctly obscure. She gave no history of syphilis and, in fact, denied sex intercourse. With the kyphosis, and the possibility of its being tuberculous, one would have to consider a low grade form of tuberculosis of the nervous system. The positive Wassermann reactions, however, would seem to rule that out, and it seems more likely that the kyphosis was due to a disordered bone metabolism in childhood, or to syphilis, rather than that the spinal fluid changes were due to tuberculosis.

In any event, this is a case of feeblemindedness with syphilis of the nervous system, demonstrated at the age of 30, which has possibly been existent since birth; in other words, possibly congenital syphilis without any of the customary signs of that disease.

CASE 13 (File number 13394).—*A feebleminded boy, aged 19, with a mental age of 7½. No clinical signs of congenital syphilis or of neurosyphilis, but moderately positive spinal fluid.*

History.—The patient was arrested on the charge of sodomy, which had existed for several months with a younger boy then out on visit from a school for the feebleminded. He was a typically feebleminded youngster, whose fund of general knowledge and reactions agreed closely with his mental age.

The family history was negative. There was no history indicating syphilitic infection of the parents. The patient had had diphtheria at the age of 3, and was very sick at that time. He had never had a head trauma. He had always been very quiet, and did not associate much with other boys. He was backward in school, reaching the fifth grade at the age of 15.

The patient considered himself normal, and was not much concerned over his present situation.

Examination.—The physical examination was entirey negative for signs of congenital syphilis, and for neurologic and mental signs of paresis. The blood Wassermann was negative. The spinal fluid showed albumin 1, globulin 1, 3 cells, and a gold reading of 0012110000.

These signs are equivocal for neurosyphilis, but do indicate an organic disease, which from experience we know is most likely to be a neurosyphilitic one. As previously pointed out, a negative Wassermann reaction in the blood serum is not sufficient evidence on which to exclude neurosyphilis, in case there are other positive tests in the spinal fluid, and this is particularly true in cases which may have a congenital origin. No other hypothesis will so satisfactorily account for the clinical and serologic picture.

GROUP 4. CASES WITHOUT PSYCHOTIC SYMPTOMS OR CLINICAL EVIDENCE OF NEUROSYPHILIS

CASE 14 (File number 10524).—*No nervous or mental symptoms of neurosyphilis. Constitutionally inferior girl, aged 20. Serology positive. Treatment. Doing well in community.*

History.—This is an extremely interesting case of nonsymptomatic neurosyphilis. The patient was admitted to the hospital April 11, 1918. Her father was reported to be a fighter, intemperate and abusive, and took no responsibilities for supporting his family. He died of tuberculosis in 1905. The mother worked out by the day, and was honest, hard working and moral. She was supposed to drink a little. The patient had four brothers, all wild. Two had court records for larceny. One was in the Lyman School, another was a conductor and supported the mother.

The patient left school when in the sixth grade, at the age of 14. She then worked in a candy factory, from which she was discharged for being disorderly. Later she was sent to the House of the Good Shepherd. She then worked irregularly, receiving no definite discipline in the home. The medical history was not especially remarkable. At the age of 14 she began to dress like a woman, painted and powdered, and often stayed out until midnight; on several occasions she stayed away from home over night. She was immoral

with many different men, but denied receiving money. Later, under training and supervision to which she responded well, she began to work out, and did her work well under guidance. She would lie to defend herself. She showed no immoral tendencies, and returned to her home to live. While there she tried several positions, but left all without giving notice. She would stay out until morning hours, and was frequently away all night. She was obviously, judging from letters and other evidence, leading the life of a prostitute and was sent here for observation.

Examination.—While here, she was quiet, accessible, cooperative and talked freely. There were no hallucinations and delusions. She seemed to have a very poor moral conception, and manifested no particular concern over her immoralities.

The physical examination was negative. There was slight tremor of the extended hands, and the knee jerks were active, but the pupils were normal; speech was normal, and there were no signs to indicate any organic involvement of the nervous system. Her mental age was 13. However, the examination of the spinal fluid on April 13 showed globulin 1, albumin 1, cells 76, gold test 5443322100. Because of some doubt whether this could be true in the absence of any symptoms, the puncture was repeated on April 18. The results were: globulin 1, albumin 1, cells 132, gold 4443333221.

Course and Treatment.—The patient was then discharged to the outpatient department where she was under treatment, it having been found in the meantime that the Wassermann reaction on the blood serum and spinal fluid was positive. In August she returned for a lumbar puncture, this time showing globulin 12, albumin 12, cells 1, gold 4433221100.

In the meantime, the patient had been working quite steadily and continues so to this day. Whereas she had not been considerably disturbed about her immoralities, she was considerably disturbed when informed that she had syphilis and that the outcome might be bad, and has cooperated well under the treatment.

This, then, represents a type of case in which, in the absence of any mental or nervous symptoms, we find marked changes in the spinal fluid, indicating an active invasion of the cerebrospinal axis. This case is quite similar to one of those presented in my previous paper.

CASE 15 (File number 13295).—*A boy, aged 15, with conduct disorder. Not psychotic, nor feebleminded. Character change at 11. Spinal fluid findings equivocal, but probably indicate neurosyphilis, possibly of congenital origin.*

History.—This boy was sent in with the statement that he acted surly, struck his mother, refused to go to school, and was placed at work and refused to work. He acted stupid at times. The father thought his mind might be affected.

The family history obtained from the father was negative. The mother was described as a normal person. The father, himself, seemed normal. He was a traveling salesman; possibly had had syphilis. There was no miscarriage. The older sister was in a school for the feebleminded; the younger sister was said to be bright, active and sociable.

The boy was always considered bright. He graduated from the eighth grade at 15, having spent two years in the sixth grade, when he began to have difficulty. He lost interest in school, did not concentrate, and spent much time

reading. He had always been somewhat surly, not responding well to correction or discipline. He was active, and played with boys of his own age. He never had had a fight.

The character change seemed to date back to about the age of 11. Of late he had been running away. He had seemed to be frightened when his father corrected him.

Examination.—The physical examination revealed nothing remarkable, except certain minor signs of malformation in the head. He was not sociable in the ward, and showed some slight mannerisms and squinting. He admitted his seclusive makeup, masturbation and smoking. He did not work well because the boys were too rough. He admitted having a bad temper, and was somewhat jealous of his sister. He seemed emotionally indifferent, not very attentive, quiet and kept by himself. His intellectual level was 12.4. He had no hallucinations, no delusions, no somnambulism, but had nocturnal enuresis until the past year. He seemed somewhat nervous, but showed no conduct disorder while in the hospital.

The Wassermann reaction on the blood serum and on the spinal fluid was negative. Other spinal fluid findings were: globulin 1, albumin 1, gold test 0023210000, twelve small lymphocytes per cubic millimeter. There was no history of trauma. There were no abnormal lung findings pointing to tuberculosis, and no evidence of any type of tuberculous involvement in the way of temperature, signs of meningitis, alterations in reflexes, etc., so that it appears most likely that the spinal fluid findings are due to a low grade syphilitic infection of the nervous system, probably congenital in origin. Incidentally, it is not particularly rare in cases of congenital syphilis in which the nervous system is chiefly involved, to find a negative Wassermann reaction and negative physical signs, with some alteration in the spinal fluid, which cannot be accounted for on the score of trauma, brain tumor, or tuberculous meningitis.

CASE 16 (File number 9282).—*Man, aged 40, without clinical evidence of neurosyphilis. No serologic evidence except Wassermann reaction positive in spinal fluid. Despite mild treatment, marked increase in serologic findings in two years, with no clinical symptoms.*

History.—This patient entered the hospital voluntarily for a lumbar puncture because his wife had developed paresis. At the time of this first examination the blood Wassermann reaction was negative in four different tests, but the spinal fluid gave a positive reaction in 1 c.c. dilution. The other tests on the spinal fluid could not be done as the fluid was bloody. He had, however, 9 cells. Because of this weakly positive Wassermann in the spinal fluid, and his wife's death from general paresis, the patient was kept in view and under mild treatment for a considerable period. The results of these tests are appended.

At no time has the patient shown any definite mental or nervous signs of invasion of his nervous system by the spirochete. His mental state has been one of some anxiety and apprehensiveness regarding

the future, as he was very much impressed by his wife's death. He has continued to handle his business efficiently and, aside from insomnia and periods when he is more actively apprehensive, during three years he has continued to show no further signs.

Throughout the fall of 1917, 1918 and 1919, until the present, this patient's blood Wassermann reaction has continued to be persistently negative, although repeatedly tested. In January, 1918, the Wassermann reaction on the spinal fluid was again positive. No other tests were recorded. In November, 1918, lumbar puncture showed globulin 1, albumin 2, cells 25, a gold reading 5554443211 and a positive Wassermann reaction. As previously stated, however, the patient has not up to the present time displayed any mental or physical symptoms which we regard as characteristic of paresis, although the spinal fluid findings have become stronger.

Treatment.—In this case I should also like to point out the failure of what might be called moderate treatment to prevent further inroads on the nervous system. During November, 1917, the patient had three injections of 0.3 gm. of arsphenamin; during December, two. In 1918, for the entire year, there were twenty-two injections of diarsenol of 0.3 gm. each, and one injection of mercury. The latter made the patient very sick, so has not been attempted again. During 1919 the patient was given six intravenous injections, a total of thirty-four injections in a year and a half, and as previously shown, the spinal fluid tests now give more evidence than ever before of the invasion.

This case is important from several points of view. In the first place, it shows that a negative Wassermann reaction in the blood serum is not sufficient evidence of noninvasion of the nervous system by the spirochete. In the second place, it shows the long duration of time during which mild change may be present in the spinal fluid before any definite mental or neurologic symptoms are encountered. In the third place, it demonstrates the failure of ordinary methods of treatment in combating a progressive disorder, such as syphilis of the nervous system.

CASE 17 (File number 5970).—*Boy, aged 22, unstable type, liar, wanderer, inventor, economically inefficient. Regarded as not psychotic but serologic findings of a paretic process. Diagnosis uncertain.*

History.—This patient was admitted to the hospital Oct. 16, 1917, from the base hospital at one of the military camps. The statement received from the military camp indicated that he had had no previous attack and that the present attack had begun about October 10. He had had a previous head injury, not serious, and the legal papers gave the following statement: "He used to run away from school at 11 years, take a rifle and study nature in the woods, deer and muskrat. Fell from a hen house, when 6 years old, on head. Typhoid at 2. Shot by boy companion when hunting rabbits. Malaria in 1913. Gonorrhea four times." "I have talked with 100 men and ten officers

and have accurate account of what each man thinks and have compared this with the same number of men in England, and have worked out the percent. I can furnish the U S. A. with meat at 4 cents a pound." "I can put my hands on millions; no one knows it, but I can." "I have proved I can introduce foodstuff." I have invented a kerosene carburetor."

At the time of admission, the patient stated that he had a great invention which would start an engine on kerosene. He had been working on it for two years, and was afraid people would steal it. He said he could supply the army with meat without beef. They thought he was crazy because he walked up and down, but he could easily prove to anybody that his inventions are of great value.

A detailed history was obtained from the family, which indicated that the patient came of a long lived family, in which no psychopathic determinants were found. He was one of eleven children, all of whom were apparently normal, except for the statement that many of the paternal relatives had a roving disposition.

The boy had less than a grammar school education, learning without difficulty. He was always very active and vivacious. Since about the age of 12 he had been disobedient and difficult to control. Sometimes he played truant from school. He never had much sense of responsibility, and was not very dependable. He was very popular with the boys, witty, quick tempered, not resentful and seldom depressed. He over-estimated himself and his abilities and assumed that every one shared his opinions. He had a general reputation of being untruthful; he told "tall" stories of his own wonderful experiences and achievements, such as the number of deer he had shot. He was very fond of hunting. He had a good deal of mechanical skill, but had not worked steadily. He was of a roving disposition. He left school because he had trouble with the teacher. He did some work in a garage, driving automobiles and repairing. The father tried to discipline the boy for the first time at 17, and he left home. For a year and a half he worked as a chauffeur in West Virginia; then returned home, and for two and a half years worked irregularly, usually in automobile shops. In 1916 he went to New York City, where he worked for an automobile concern. Later he called himself "Huppy" Smith, and claimed to be a great race driver. He returned four or five months later. He told his family that he had made one or two trips across the water, taking care of horses on a boat. They did receive some cards from him mailed at London and Liverpool. He worked for a time in an automobile shop, but was habitually late; then for a time with his father, and then as overseer of men in the repair of roads. His family regarded him as something of a mechanical genius, and had petted and praised him a great deal on that account.

At the age of 17 he had what was supposed to be a Neisser infection, which was treated for two or three months and is said to have been cured. He was hypochondriacal and made a big fuss at a little pain.

He was drafted into the army and two days later began to write to his people that he was not fit for army service A week after he went to camp the family visited him. They found that he had lain five days on his cot with his coat folded and placed under his head for a pillow. They were told that he had been inoculated for typhoid fever and directly after had fallen against a radiator and cut his head. By October 13 he was much disturbed because he had had no opportunity for bathing, was nervous and homesick. After his usual manner, he told exaggerated stories.

The informant, a brother, gave no history of hallucinations or of what appeared to him to be delusions. He thought that the patient's ideas in regard to his invention were not irrational, that he had been working on it for two years. There was no history given of convulsions, syncope or other physical symptoms.

Examination.—The physical examination showed that he was well developed and well nourished. The face was asymmetrical, the nasal septum deviated to the right; there was a mucopurulent discharge from the nose. Some teeth were missing; others carious. Heart and lungs were normal. The blood pressure was: systolic, 120; diastolic, 80. The pupils were equal and regular, and reacted to light and distance. Knee jerks were active and equal. There were no abnormal reflexes. The ophthalmoscopic examination was negative. Roentgenogram of the head gave no evidence of trauma. The urine was negative.

On mental examination it appeared that the patient was quite satisfied with himself and discussed his hopes quite freely. He was anxious for assistance to present his plans to the authorities. He seemed somewhat overactive, although not markedly so. He was extremely talkative with a remarkable flow of speech. He was correctly oriented, and did not consider himself ill but in a dilemma. He appeared to believe that because of his deliberate intention to make himself nervous and ill he was sent here. He asserted that he wanted to appear queer so that he might get his plans before high authorities. He also stated that he had said all the queer things he could think of when brought before the doctor. His memory was quite good, but in his account of his past experiences he showed an egotistic attitude. He stated that at 15 he started to see the country because he felt that he had had little education. He would work a few days, then travel to another place. He named a great group of towns in West Virginia in which he claimed to have lived. He said he had been in New York, New Jersey, Kentucky, Tennessee, Ohio and Arizona, and that he had traveled over nearly every state in the West. He said that he had falsified his age when 16, in order to vote. He gave a long and circumstantial account of his wanderings over the United States and crossing to England, and a very detailed account of all the things he did while working in the garage at home. He asserted that following a fire in a large private game preserve, he had noticed the next year that the deer were feeding on the tender shoots in the burned district, and yet the bushes and trees and grass grew and became more luxuriant than on similar land outside the preserve. So the idea came to him that deer feeding on vegetation did not destroy it, but apparently did it good, and, therefore, a given number of deer per acre would be self-sustaining having always a constant source of food supply. On this problem he had been working ever since. He says he has been a mighty hunter, having killed many deer, both in and out of season. He finally calculated that the acreage required for the deer was the same as for the cow in pasture, one half acre per head. He gave elaborate details on the subject of the care of a herd, breeding, etc. He worked out two schemes, quite absurd, for feeding the army meat without using beef.

The patient also gave a long, detailed mechanical description of a carburetor which would use kerosene instead of gasoline.

On the basis of the history that the boy had always been queer, a good deal of a liar, a rover, and that ideas of the type presented above had been frequent, together with the family's feeling that he was a mechanical genius, we regarded him as not psychotic. He was over-

active and quite talkative, and emotionally elated and egotistic. But as all of these things were described as being a part of his usual makeup, and as his intelligence was quite up to that of the average adult, we conceived that he was a case of psychopathic personality. The Wassermann reaction on the serum, however, proved to be positive, whereupon a lumbar puncture was done, which showed globulin 1, albumin 1, cells 63, and Wassermann reaction strongly positive. Another neurologic examination proved to be negative. Further inquiry did not reveal a memory defect or any of the characteristic or essential symptoms of general paresis. Accordingly, the classification of the case is extremely difficult, although it is obvious that we have to do with a case of neurosyphilis, whether congenital or acquired is not certain, in a boy who otherwise shows very little except psychopathy. Of course, the ideas which he presents are absurd, but not more absurd than the beliefs of many people who are regarded as normal. It seems clear from the facts obtained that if neurosyphilis did not exist from the first, we deal with a case in which developing neurosyphilis has not so far altered the clinical symptomatology.

CASE 18 (File number 12051).—*Pseudoparesis in a man, aged 33. No syphilitic history. All serology negative.*

History.—This case is presented from an entirely different point of view. The man was first seen in consultation at a general hospital, where his memory defect, euphoria, general dulness, tremor, speech defect, loss of calculation ability, pupils and incontinence led to a diagnosis of general paresis, but the blood and spinal fluid findings were negative. Because of this the patient was transferred from the general hospital to our institution on Jan. 28, 1919. For the past few months the patient had become forgetful and it had become difficult for him to think and focus his attention. He was very drowsy a great deal of the time and had headaches and pains in his legs. On admission it was difficult to hold his attention and very little information could be obtained because of his poor memory. He showed a speech defect. He gave a history of influenza in November, with good recovery.

Examination.—On physical examination nothing abnormal was found on the sensory side. His speech was defective. Test phrases were repeated poorly. The gait was wide based and shuffling. Station was not defective. He had coarse tremor of the hands. The superficial reflexes were all present; the deep reflexes were present and active. There were no abnormal reflexes. The pupils were slightly irregular, but reacted to light and distance. The patient was incontinent.

Mental examination revealed approximately what has been given before; namely, that he was somewhat euphoric, and attempted to cooperate. His memory was very poor, especially for recent events. Retention of school knowledge was poor. He could not give a good history of his own past life. He gave a past history of malaria in 1906 and in 1910. He had been alcoholic when in the army, but could give no additional facts. There were no delusions and no hallucinations. Associational range was narrow. He had complained of severe frontal headache, slight blurring in vision, projectile vomiting, but no

attacks. All the time he had been under observation, either at the general hospital or here, his blood was negative to the Wassermann test, and his spinal fluid negative to all tests. We considered the case as probably one of frontal lobe tumor for reasons that need not be given here.

My sole purpose in reporting this case is to raise anew the question of pseudoparesis, which is to my mind of doubtful value as a conception. The case also brings forward the point that neurologic signs, nonfocal in character, of generalized cerebral invasion, may be produced by other things than the spirochete, and that, accordingly, clinical evidence alone is not enough to establish the presence or absence of spirochetes in the brain. This case has wide and important bearings on the question of the postinfluenzal psychoses, and will later be considered in that connection.

CASE 19 (File number 12244).—*A man, aged 36, with a hemiplegic stroke at 34; neurologic signs of organic disease; serology negative. Treatment; two months later serology positive.*

History.—The patient was admitted to the hospital on voluntary application, March 6, 1919. He complained of inability to concentrate, following a stroke in October, 1917, and seemed to be mildly depressed. The mother seemed to have been somewhat peculiar, having attacks of hysterics, so-called, at the time of the menopause.

The patient was a high school graduate. Later he was successful in the wool business, going into a larger concern on a partnership basis in October, 1917. He was ousted from the firm and there had since been a great deal of difficulty about arranging financial matters in connection with his interest. His wife regarded him as an affectionate, sensitive man, nervous because it was difficult for him to keep still. He did not worry, did not care for dances or the theater, was bright, well informed and fond of outdoor sports. He had some impediment in his speech. He was not a drinking man until the time of his business difficulty, when he began drinking, the exact amount was unknown.

Oct. 23, 1917, he had had a stroke. He had previously complained of feeling tired and found it an effort to do his work. At the time of the stroke his face was drawn to the left; his speech was thick; he said there seemed to be a film over his left eye. His right arm and leg were paralyzed. He fell, losing control of his limbs, but regained the use of his leg the following day. He remained in bed two weeks, and at the end of that time was able to walk. He was unable to cut meat for himself until December, and until that time it was difficult for him to keep food in his mouth. From December to April he was in a sanatorium; he spent his time in outdoor sports. When he returned to Boston he felt well enough to go back to business, but was unable to start anything because of the situation then existing in the wool market. He made an attempt to do other kinds of work, but this depressed him, and he felt unable to do so. In July he became very much depressed and somewhat later disappeared. He wrote letters that he was going to the Maine woods, then that he was going to Chicago. Ten days later he was in Boston. He said that he had been in a hospital in Chicago, but could not remember its name or why he had gone there. He then seemed somewhat better, but did not return to

work. He had a slight attack of influenza in September, apparently without bad results. In January, 1919, he again became depressed. He refused to mingle with people. Once he said, "You know what I am going to do if my head doesn't get better. I have often thought of killing myself," but he made no attempt at suicide. He complained that some of his thinking power had been taken away. He seemed to lack attention and concentration.

Examination.—Physical examination revealed that he was well developed and well nourished. There was impaired vision in the left eye. There was no disturbance of ocular movements; no abnormal reflexes. Gait and station were normal. There was slight tremor of the tongue. All superficial and deep reflexes were present. Knee jerks were unequal, hyperactive. Pupils were dilated and reacted to light through a narrow range. The blood pressure was: systolic, 120; diastolic, 85. The spinal fluid was entirely negative. The Wassermann reaction on serum and spinal fluid was negative. The left eye-ground showed a peculiar arrangement of vessels in the disk, and probably some slight choking. The right eye-ground was negative.

The patient was easily disconcerted if questions were asked too rapidly, but his memory was good and he gave a coherent and detailed account of his past life. He seemed somewhat depressed. He was slow to answer and used stereotyped expressions.

A very careful and thorough neurologic examination failed to reveal anything indicating a focal lesion. A total of seven blood Wassermann tests were negative, both before and after provocative arsphenamin injection. A roentgen-ray examination was practically negative.

The patient was pleasant and cooperative and gradually became somewhat less depressed. He then went voluntarily to the Grafton State Hospital, where in May, 1919, another lumbar puncture was done, showing a positive Wassermann reaction, albumin normal, globulin 0, cells 57, gold test reading 2442330000. The Wassermann reaction on the serum was negative.

Accordingly, we have here a case with a definite history of a hemiplegic stroke occurring eighteen months before the patient was seen, with considerable recovery of function, but with some difficulty in concentration, attention and rapidity of thinking and acting. No history of syphilis was obtained. He had been somewhat alcoholic immediately prior to the stroke and was, at the time of our examination, not psychotic, although showing some neurologic findings. The negative serology would seem to exclude neurosyphilis, but under the influence of treatment the spinal fluid showed markedly positive findings in the way of Wassermann reaction, cell count and gold reaction, although the Wassermann test on the serum and the protein content remained negative. Hence, in the presence of neurologic signs, a negative serology is not enough to exclude neurosyphilis. Accordingly, the importance of equivocal signs is emphasized.

SUMMARY

1. Nineteen cases are presented, of which fourteen are undoubted cases of neurosyphilis, one a case of pseudoparesis and four have negative physical and equivocal serologic findings.

2. Of the fourteen undoubted cases, only four present clinical evidence from which a diagnosis of neurosyphilis could be made.

3. Neurosyphilis occurs more frequently in association with paranoid psychoses than is usually recognized. Although six cases are here reported, not one is a clear example of the syphilitic paranoid psychosis, two being heavily alcoholic, one a paretic, and two possibly not neurosyphilitic, though showing changes in the spinal fluid.

4. Any type of abnormal mental state, or no abnormal state, may occur with neurosyphilis. It does not follow that all such cases are paretic.

5. Serologic findings may definitely increase under treatment, with or without increase of clinical signs, emphasizing the importance of provocative treatment in rare cases.

6. A negative blood Wassermann reaction, or many such, are not always conclusive negation of the presence of neurosyphilis.

7. A negative spinal fluid is not absolutely conclusive evidence of the absence of neurosyphilis.

8. Since neurosyphilis may exist in association with any type of mental symptoms, and since such states may exist in the absence of any of the usual signs and symptoms of neurosyphilis, it follows that lumbar puncture should be done at least in all cases which present any atypical features. It is equally important to puncture cases with any clinical signs of neurosyphilis, since the signs may be misleading.

9. The prognosis and treatment of any cases are always modified by the presence of neurosyphilis.

10. Neurosyphilis as a disease may exist for a long period before symptoms appear.

HEREDITY IN EXOPHTHALMIC GOITER

WITH A REPORT OF TWO JUVENILE CASES *

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In his excellent work on heredity, Dejerine[1] pointed out the fact that exophthalmic goiter occurs in neuropathic families. He looks on exophthalmic goiter as a form of an hereditary neurosis. Long before Dejerine, Rendu[2] wrote that persons with this disease had among their ancestors, aliens, epileptics and general paretics. Rendu claimed that there must be a certain relation among all these diseases. Since then Gauthier[3] has shown the important rôle played by the thyroid gland in Basedow's disease. Several writers on the subject have attempted to show that there is a direct heredity in exophthalmic goiter. Pende[4] states that primary exophthalmic goiter is always associated with a constitutional hereditary state of irritability and instability of the thyroid, or the regulating nervous system of the thyroid secretion. Pende bases his statements particularly on the reported cases of hereditary exophthalmic goiter. It must, however, be admitted that a fairly careful search of the literature on the subject fails to show an abundance of direct heredity in this disease. Frey[5] reports a family of four, a father, aged 46, two daughters and one son, all suffering from exophthalmic goiter. Schultheiss[6] quotes a number of instances from the literature and reports on a family, several members of which suffered from exophthalmic goiter, as well as from diabetes and epilepsy. Leopold-Levi[7] in discussing the subject points out the rôle of the thyroid instability. Carder in discussing Levi's cases states that the mendelian law of heredity may be applied to exophthalmic goiter disease. Baillich[8] reports a case of a girl, aged 6½ years, suffering from exophthalmos;

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1. Dejerine: L'heredite, dans les maladies des systeme nervaux, These d'agrey 1886, p. 157.
2. Rendu: Quoted from E. S. Schulmann: Le goitre exophthalmique syphilitique, These Paris, 1918.
3. Gauthier, de Charolles: Quoted from Longuez Lermagez: Rev. neurol. **26**:20, 1919.
4. Pende, N.: Endocrinologia, Milan, 1916, p. 782.
5. Frey, E.: Jahresbericht Neurologie und Psychiatrie **13**:753, 1909.
6. Schultheiss, E.: Ueber Erblichkeit Morbus Basedow, Inaugural Dissertation, Jena, 1909; Ztschr. f. Neurol. und Psychiat. **13**:750, 1909.
7. Leopold-Levi: Familles thyroid et dysendorm, Gaz. d. hôp. **86**:381, 1913.
8. Baillich, G.: Goitre exophthalmique chez une fillette des sept ans heredite similaire, Bull. et mém. Soc. méd. d. hôp., de Par. **30**:708, 1914.

her father suffered from exophthalmic goiter, her paternal grandmother had a goiter and cardiac trouble, and her mother was extremely nervous. This author believes the disease is transmitted through females. Chapin[9] discusses the subject of transmission; contrary to the established belief this author proves that women suffering from exophthalmic goiter are prone to great fecundity. His statistics on forty-four women gave to each an average of 4.3 children while that of the normal is 2.5. Many of these women were below 30 years of age. Pregnancy is not affected by exophthalmic goiter and miscarriages are rare. Chapin further shows that the mortality of these children is rather high and that heredity presents itself in similar conditions and other nervous heredity.

Dubrenil-Chambardel[10] also reports a high mortality in infants of mothers suffering from exophthalmic goiter. He further reports a family in which an hysterical mother gave birth to ten children, eight of whom suffered from Basedow's disease. Cases of similar and dissimilar heredity are also cited by Bayloe.[11] Gauches and Salin[12] report a case where hereditary syphilis showed itself in the form of polyglandular hyperthyroidism. Schulmann[13] goes rather more deeply into the subject. After reviewing the literature and citing his own cases, Schulmann comes to the conclusion that hereditary syphilis plays an important part in disturbance of thyroid secretion, and in certain cases a more or less typical form of exophthalmic goiter may result.

Lonques and Lermoyez[14] report a family with seven cases of exophthalmic goiter. Some further reference to the literature may be found in that article.

REPORT OF CASES

CASE 1. *History.*—M. B. (Fig. 1), aged 10, came to the Mount Sinai dispensary in September, 1919, with the complaint of swelling in the neck of three months' duration and "nervous spells." Physical examination showed that the child had a pulse of 156; blood pressure—systolic, 125; and diastolic, 85; marked exophthalmos and a marked Möbius' sign. There was a fine tremor of both hands; the face was flushed; there was considerable emaciation; the pupils were markedly dilated and the boy was in a state of apprehension and excitement. There was a marked increase in cardiac dullness to the left, derma-

9. Chapin, A.: De la descendance des Basedowiennes, These Paris, 1910.

10. Dubrenil-Chambardel: Un cas des Basedow hereditaire avec scoliose hereditaire. Province méd. 1907, p. 262.

11. Bayloe: Arch. Med. Tolouse 1896, p. 30.

12. Gaucher et Salin: Insuffisance ovarienne et syndrome des Basedow fruste? Une heredo-syphilitique, Bull. Soc. franç. de dermat. et syph. **23**:62, 1912.

13. Schulmann, E. S.: Le tique goitre exophthalmique syphilitique, These Paris, 1918.

14. Lonquez et Lermoyez: Rev. Neurol. **26**:20, 1919.

graphia was present and all the reflexes were exaggerated. Urine was negative; hemoglobin, 70 per cent.; red blood cells 4,024,000; white blood cells 7,200; polynuclears, 62 per cent.; small mononuclears, 29 per cent.; large mononuclears, 7 per cent.; and eosinophils, 1 per cent. Roentgenographic examination the next day showed marked enlargement of the thoracic aorta together with an exaggerated cardiac action. There was an indistinct shadow in the anterior mediastinum which surmounted the aorta and was somewhat suggestive of an enlarged thymus.

While examining the boy, it was noticed that his mother (Fig. 2) who accompanied him presented a typical picture of Basedow's disease, and inquiry elicited the following data.

Case 2.—*History.*—Mrs. B. C. (Fig. 2), the mother of Case 1, is 29 years of age. Her family history shows that her father died from diabetes and her mother suffered in earlier life from attacks of cardiac palpitation, had an enlarged thyroid and had lost considerable weight; but as she grew older her

Figure 1

Figure 2

Fig. 1.—Exophthalmic goiter in a boy aged 10.

Fig. 2 (Case 2).—Mother of patient in Case 1, suffering from exophthalmic goiter.

symptoms improved and the swelling in the neck diminished. One sister of the patient underwent operation for exophthalmic goiter at the Mount Sinai Hospital, and another sister is also suffering from a goiter. Mrs. B. C. has had three children and no miscarriages. Only one child is healthy, the third child, a little child aged 6, is suffering from an enlarged thyroid gland. This case will be reported below.

Examination.—The patient stated that she suffered from frequent cardiac palpitation similar to that of her mother, profuse perspiration, attacks of diarrhea, restlessness and insomnia. There was a marked exophthalmos, and a marked Möbius sign. The patient was emaciated, had a fine tremor of the hands and a tremor of the head was distinctly felt when the examiner's hand was placed on top of it. She had a markedly enlarged thyroid particularly of the left lobe, and marked dermographia. The reflexes were lively. The pulse was 140; systolic blood pressure, 138; and diastolic, 85. She had marked

pyorrhea. The urine was negative; hemoglobin, 60 per cent.; red blood cells, 3,728,000; white blood cells, 8,000; polynuclears, 52 per cent.; small mononuclears, 37 per cent.; large mononuclears, 10 per cent., and eosinophils, 1 per cent. Roentgenographic examination of the chest showed marked over-activity of the heart with distinct dilatation, hypertrophy of the left ventricle, considerable dilatation of the aorta, but no evidence of an enlarged thymus or substernal thyroid.

At the request of the examiner, the mother of this patient and grandmother of the first patient was brought to the clinic.

Case 3.—*History.*—Mrs. M. W., aged 55, a widow, whose father lived to old age, and whose mother was a very stout woman, had three daughters and one niece who suffered from exophthalmic goiter, and one of her sons was insane. Her husband died from diabetes. The patient was well until about fifteen years

Figure 3

Figure 4

Fig. 3 (Case 4).—Child, aged 6, with exophthalmic goiter.

Fig. 4.—Woman, aged 33, with exophthalmic goiter. Maternal aunt of patients in Cases 1 and 2.

before she presented herself when she began to suffer from cardiac palpitation and to lose weight rapidly. About one year later she suffered from flushes, and at this time the menopause set in. Her cardiac palpitation continued until about two years ago. At the time of the onset of the thyroid symptoms the gland began to swell, but later on this subsided. After an intra-abdominal operation three years ago, the thyroid symptoms apparently disappeared. At presentation the patient complained of general weakness and rapid exhaustion.

Examination.—This showed a woman who looked much older than the age stated. The pulse was 100; systolic blood pressure, 120; diastolic, 80. There was no von Graefe but a distinct Möbius sign is present. There was general emaciation. The reflexes were lively. Blood examination showed: hemoglobin, 65 per cent.; red blood cells, 3,500,000; white blood cells, 8,000; polynuclears, 60 per cent.; small mononuclears, 25 per cent.; large mononuclears, 12 per cent.; eosinophils, 3 per cent.

Case 4.—*History.*—(Fig. 3). The patient, aged 6, the daughter of the patient described in Case 2, and granddaughter of the patient described in Case 3, was brought to the clinic by request. Her mother stated that nothing abnormal except the enlargement in the neck could be seen in the child. Examination revealed a very large thyroid, and a von Graefe sign, but no other ocular symptoms. Her pulse was 100, and she had mild anemia. The urine was negative. A roentgenogram of this patient was not secured.

Case 5.—*History.*—B. B. (Fig. 4), the daughter of the patient in Case 3 and sister of the patient in Case 2, aged 33, married, has two healthy children, and gives the same family history as the patient in Case 2. The patient states that she suffers a good deal from painful menstruation, but the periods are regular and normal in quantity. At about the age of 25 she began to notice the enlargement of the thyroid gland, and at the same time the hyperthyroid symptoms began to appear. At the time of presentation she showed a distinct von Graefe sign, a distinct Möbius sign, a general enlargement of the thyroid gland, the right lobe being somewhat larger than the left; she had a fine tremor of the hands; a distinct bruit was heard at the neck; the pulse was 130; the heart was enlarged; the systolic blood pressure was 128; diastolic, 70. The urine was negative; the blood count was not made. Roentgenographic examination showed enlargement of the left ventricle. During the examination the patient was in a state of marked perspiration, and showed marked dermographia.

The daughter of Case 3, who underwent operation for enlarged thyroid, was seen by the examiner, but unfortunately complete examination could not be made. It was, however, learned that she had been gradually improving since the operation, though at times she still suffered from cardiac palpitation.

ANALYSIS OF CASES

On analyzing our cases, we see that the mother of the patient in Case 3, the great-grandmother of the patient in Case 1, was a very stout woman. We will not be wrong if we presume that in all probability that woman suffered from a hypothyroid condition. Nature, in order to compensate this condition, gave to the patient in Case 3 the hypersensitive gland which began manifesting undue secretion at middle age. This woman in turn gave birth to children with distinct hyperthyroidal signs which assumed a pathologic aspect in the form of exophthalmic goiter. Here a process of degeneration took place. Nature was apparently making an attempt to eliminate this family. Members of the third generation began to develop symptoms of the disease at the age of 27; in the fourth generation the symptoms began to present themselves in a girl of 6 and in a boy of 10. A natural process of extermination is apparently taking place.

Apparently another factor besides the thyroidal instability is added to the situation of this family, and that is the diabetes in the grandfather of the patient in Case 1. Whether it is due to this factor, or to the instability of the thyroid itself, the fourth generation can no longer

procreate, in spite of the fact that the husband of the patient in Case 2, the father of the patients in Cases 1 and 4, is a perfectly healthy man of athletic build and even temperament. Consanguinity in this family could not be detected. A Wassermann test was made in all except Case 4, and every reaction was negative; syphilis, therefore, may be excluded. The transmission was a direct one and along the female line. It may also be emphasized that the occurrence of Basedow's symptoms in a boy, aged 10, and in a girl, aged 6, is in itself an extremely rare condition, well worth reporting.

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THE CURATIVE INFLUENCE OF INFLUENZA IN A CASE OF SPECIFIC MENINGOMYELITIS WITH CYSTITIS *

CHARLES W. BURR, M.D.

PHILADELPHIA

In the older books on medicine, written in what we moderns like to call, perhaps not quite accurately, the prescientific age — before students had become slaves to instruments of precision, when increase of knowledge came only by sharper observation, when chemistry was still alchemy and physiologic chemistry was yet unknown, and when comparative pathology was impossible because the human mind, held in the fetters of religious myth, could not conceive that disease is the same in man and animals — there are many references to the fact that sufferers from certain diseases are immune to certain others. Thus, e. g., victims of gout were well known to be immune to certain other disorders. More or less fantastic hypotheses were called in to explain the phenomenon and, after a time of active interest, there followed a long period in which little or no attention was paid to the matter. Still later came the discovery of the specific vaccines, attempts at explanations of their mode of action, and in recent years, with a widening point of view, an increasing literature on the subject of the curative influence of nonspecific proteins; in other words, the antidotal influence of one infection against another.

Today there is an active interest in this question of the curative, or at least ameliorating, influence of foreign proteins in acute infectious diseases, and renewed attention is being paid to the old subject of the influence of one infection on another. For example, it has long been noted that acute gonorrhea subsides during typhoid fever. Several investigators have noticed that in paresis intercurrent infections are frequently accompanied by a "remission" of the mental symptoms of the disease. The antagonism between carcinoma and tuberculosis has long been known. Von Wagner obtained favorable results from the tuberculin treatment of paresis. He believed that its use increased the favorable action of antisyphilitic treatment, and Donath suggested treatment by abscesses from turpentine injections. Several similar therapeutic measures have been tried, but none has stood the test of time..

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* Read at the meeting of the Philadelphia Neurological Society, Jan. 23, 1920.

The following case is an example of the favorable influence exerted by an acute infection—influenza—on an illness of many months' duration, enabling a bedridden woman suffering from an old meningomyelitis, with severe cystitis, to recover sufficiently to do housework.

REPORT OF CASE

History.—The patient was a housewife aged 36, who came to the Orthopedic Hospital and Infirmary for Nervous Diseases, Aug. 19, 1917. She stated that her illness began in January of that year with constant and severe pain and stiffness at the back of her neck, numbness in both arms, and later pain in both legs. The symptoms slowly grew worse and she became bedridden the following March. Soon after she was confined to bed it became difficult to pass urine and her bowels thereafter moved only by the use of enemas and drastic purgatives. For four weeks she had to be catheterized. At that time also there was complete palsy in her arms and legs, but she had no trouble in speaking or in swallowing. By the end of April she had improved enough to leave bed and was able to stagger around the house, though she still had pain in the right leg and both arms and some palsy in her extremities. After a short time she gradually grew worse. By July she had lost all power in both legs; she was compelled to use enemas, and to have the bladder emptied by the catheter. In the same month she began to have trouble with vision and, for a time, transitory diplopia.

Her past history showed that she had had typhoid fever when 12 years old. Something that was called congestion of the brain followed the birth of her first child. She had five living children and had had no miscarriages.

Examination.—On admission there was absolute palsy of arms and legs with paralysis of the bladder and rectum. Speech was normal. The facies was expressionless and smoothed out, indeed it resembled that of paresis, but during the course of her illness she did not have any of the mental symptoms of that disease. There was tactile anesthesia from a level just above the breasts on the trunk, and on the arms it was present, growing more distinct as one approached the hands. The knee jerks were spastic and ankle clonus and the Babinski reflex were present on both sides. There was no deformity of the spine and no pain on pressure. The heart action was regular and, though the sounds were of poor quality, there were no murmurs. Her blood pressure was: systolic, 100; diastolic, 60. The lungs were normal. Electrical examination of the arms and legs revealed no reaction of degeneration. There were no trophic changes in the skin, but some weeks later a superficial burn caused by a hot water bag was very slow in healing. (Later she had bedsores on the buttocks.) She menstruated several times while at the hospital. By Nov. 10, 1917, she could use the arms quite a little, though still unable to stand. There were involuntary jerking movements of both legs at times, and she had a distinct girdle sense. There was gray atrophy in both eyes and the blood vessels in the fundi were narrowed and thin. The right eye had 5/200 vision, the left could distinguish hand movement. The pupils were irregular in outline and their response to light was very poor. The blood Wassermann test, which was taken immediately on arrival at the hospital, was ++++. On arrival, and throughout her stay, there was marked cystitis. At times the urine was ropy. On March 16, 1918, the bacteriologic examina-

tion of the urine revealed an almost pure culture of colon bacilli and a few staphylococci.

The blood examination revealed: red blood cells, 3,600,000; white blood cells, 15,600; hemoglobin, 0.68. The red blood cells varied much in size and intensity of color. There were 3 per cent. eosinophils. The red corpuscle count and the hemoglobin percentage remained fairly constant, but the number of white blood cells varied greatly from time to time.

Course and Treatment.—The patient had many febrile attacks of varying duration during her stay in the hospital. The temperature would suddenly shoot up to 103 F., then for some days it would be normal and then go up again or swing between 103 and 100 F., and finally after a varying time remain permanently normal for days or weeks. I could find no other cause for the fever than the cystitis and the bedsores. As to medical treatment, she was given potassium iodid up to 300 grains a day; she received large doses throughout the greater part of her stay in the hospital. Mercurial inunctions were used. She had a few injections of salvarsan but without any marked immediate effect. All antisyphilitic treatment was stopped four months before leaving the hospital.

The patient was discharged July 20, 1918. She was then bedridden, completely palsied in bladder and rectum and in the legs and had bedsores on the buttocks. She could use both arms weakly. The urine was thick as cream. I sent her home to die. In December, 1919, her family physician gave me the following account of the course of events: For several months after going home there was no change; then she was seized with an illness, which he diagnosed as influenza. Her fever (102 F.) lasted only a few days and then to his surprise her urine began to clear up and within a few days all signs of cystitis had passed away. At the same time she began to regain control of the bladder. Shortly after power began to return in her legs and after some weeks she was able to stand. Improvement continued for months.

When she came to my office, during the Christmas holidays of 1919, she walked in. Her gait was spastic but she needed no help, not even a cane. She had good control of bladder and rectum. The deep reflexes in the legs were increased. The bedsores were healed. Her arms were normal. There was no anesthesia. The urine was normal. She told me she cooked and did other work in her house and stayed up all day.

COMMENT

The explanation of the mode of action of both specific and nonspecific protein therapy is still hypothetical. Either there is a stimulation of bodily resistance to disease, or a destruction of the micro-organisms themselves, and hence a cessation of the production of toxins, or there is a real antidotal effect, i. e., the chemical introduced destroys the poison produced by the micro-organisms of disease.

I suspect that in my patient the long continued cystitis acted as a continuous poison and increased general weakness so greatly as to make it impossible for the patient to use what little of her cerebrospinal motor apparatus remained intact. I also believe the influenza cured the cystitis and thus left the patient with a somewhat injured

but workable nervous machine. The original lesion was a syphilitic meningomyelitis, but I am inclined to believe that the antisyphilitic treatment stopped further progress by the spirochetes. I do not, however, propose the artificial induction of influenza as a curative measure for inflammatory diseases of the spinal cord.

Obituary

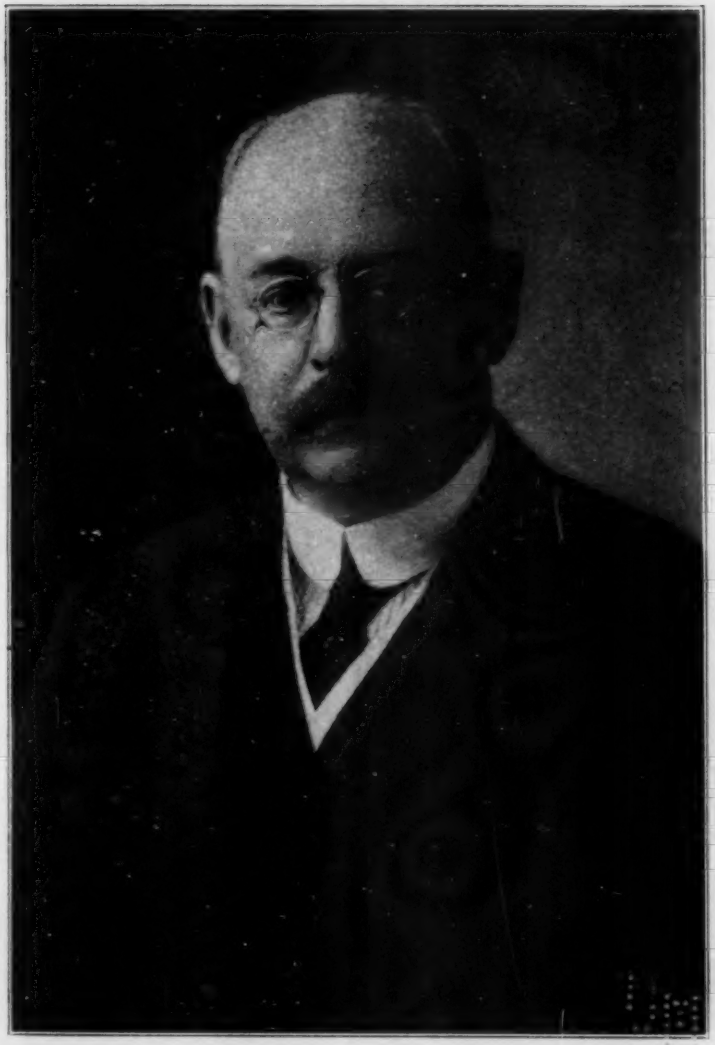
PHILIP COOMBS KNAPP, A.M., M.D.

Philip Coombs Knapp was born June 3, 1858, at Lynn, Mass., where he received his preparatory education. He graduated from Harvard College with the class of 1878, and entered the Harvard Medical School. He received the degrees of A.M. and M.D. in 1883, after service as house officer at the Boston City Hospital and the Boston Lunatic Hospital, as it was then called.

Among the neurologists of this country who may be said to have influenced medical science should be ranked the strong personality of Dr. Knapp. Besides his scientific attainments he was a scholar and litterateur, with a singularly well-ordered mind, a superretentive and accurate memory, and a large store of learning on a great variety of subjects. He possessed a wide knowledge of current literature, history and friction, and together with a solid grounding in the dead languages was familiar with French, German, Italian, Spanish and even Portuguese. He was an omnivorous reader, a close student of Dante, a writer on scientific subjects in leading magazines, as well as a speaker of excellent diction and a fluent though trenchant debater. As an extensive writer on medical subjects he is perhaps best known. All these accomplishments he enlisted in the service of neurology wherever possible. He was past master in its bibliography.

In 1887, 1895, 1901 and 1911 he acted as editor and cotranslator of the successive editions of Strümpell's "Text-book of Medicine," adding to the last an original section on mental disease. His first work as an author was a volume on "The Pathology, Diagnosis and Treatment of Intracranial Growths" which he published in 1891. He contributed the section on "Nervous Affections Following Railway and Allied Injuries" in Dercum's textbook on nervous diseases, and "Feigned Diseases of the Mind and Nervous System" in Hamilton's system of legal medicine. Few of the aspects of neurology or psychiatry escaped his ready and instructive pen, as the long list of his contributions to medical publications bears witness.

He held numerous positions and memberships, among them: the presidency of the American Neurological Association, the New England Society of Psychiatry and the Boston Society of Psychiatry and Neurology. He was a fellow of the Royal Society of Medicine, and a member of the Neurological Society of the United Kingdom, the New York Psychiatrical Society, American Institute of Criminal Law and



PHILIP COOMBS KNAPP

1858–1920

Criminology, the American Association of Medical Jurisprudence, American Medico-Psychological Association, American Medical Association, and several others. For five years he was a trustee of the Boston Insane Hospital. He was especially devoted to the interests of the American Neurological Association, and was among the foremost of its members in promoting a high standard of membership and quality of work.

Although by nature inclined to be silent and uncommunicative in private, he rarely missed an opportunity to speak—and to the point—at medical meetings which he attended religiously. His opinions, once carefully formed, he held to tenaciously, and was determined and outspoken in supporting them.

As a medical expert he was effective and thoroughly at home. Here his imperturbability stood him in good stead, while his discernment and fund of knowledge of nervous and mental conditions and criminology gave great weight to his testimony. He was consequently in great demand in medicolegal cases, and was highly respected by both bench and bar.

Of Dr. Knapp as a clinician, a former student of his, Dr. Cannon, professor of physiology in the Harvard Medical School, gives the following testimony from personal experience:

> Dr. Knapp placed extraordinary insistence on thoroughness. Each one of us in turn had to take charge of the examination of a patient while Dr. Knapp and the rest looked on, and to examine him from top to toe and report with exactness on everything that we found. After that there was a discussion of the interpretation to be placed on the objective findings which was highly illuminating. This experience was one which appealed to me very strongly, and I have repeatedly testified to the excellence of Dr. Knapp's method. Along with it there went in his teaching a dry humor which many of us much appreciated. He frequently made references to novels and other reading, and I recall his testimony that he managed to get through at least a novel a week. I have always regretted that more men did not have the advantage which I had of coming into relations with Dr. Knapp as a student, and deriving from him the discipline which he so capably enforced.

From 1886 to the time of his death Dr. Knapp held the position of physician for diseases of the nervous system at the Boston City Hospital where he soon became noted for his skill in diagnosis. From the first he was indefatigable in his efforts toward the development of that department, and he enjoyed the satisfaction of seeing it grow, through many years and much opposition, from a small outpatient clinic to a separate department for nervous cases on special wards. He was also a warm advocate of the treatment of mental cases on the wards of general hospitals, and was instrumental in having the practice adopted at the City Hospital — an entirely new departure in New England, and with but one or two exceptions in the entire country.

About five years ago he had a hemiplegic attack from which he soon recovered sufficiently to resume work. This he did with his old determination but diminished vigor and impaired motility. Nevertheless he spurred himself on and fulfilled his regular duties, in court, at the hospital, in private practice, etc. Even during the last six months of his life when he became increasingly and plainly incapacitated, he persisted in his efforts with indomitable spirit, only taking to his bed when locomotion became impossible. On Feb. 23, 1920, he died of cerebral thrombosis at the Boston City Hospital where he had served faithfully for thirty-five years as visiting physician. His widow survives him.

Dr. Knapp's strongest characteristic, known only to his intimates, was a constitutional diffidence that bred a certain taciturnity and unresponsiveness, and led him to assume a mental attitude which was at variance with his true nature. Only his closest friends therefore could fully know the warm heart, the loyalty in friendship, the fund of humor and store of knowledge which lay beneath.

HENRY R. STEDMAN, Boston.

Abstracts from Current Literature

ABSTRACTS OF SOME RECENT WORK ON THE NEUROGLIA BY THE SPANISH SCHOOL

The following abstracts are an attempt to summarize in a cursory manner the most important services rendered to histopathology of the central nervous system in the last few years by the Spanish school of histopathologists. Any abstract gives but a pale shadow of the original work and in this case the limitations are much exaggerated by the lack of illustrations which are admirable in profusion, accuracy and beauty in the original articles.

EVOLUTION OF THE NEUROGLIA AND SPECIAL CONSIDERATION OF ITS RELATIONS TO THE VASCULAR APPARATUS.

N. Achucarro, Trab. de lab. de invest. biol. Univ. de Madrid **13**:169, 1915.

The author emphasizes the importance of the theory of the endocrinic activity of the neuroglia, the increased acceptance of the theory (Nageotte, Mawas, Achucarro, Cajal, Collins, etc.) and the prominent position which the glial "foot" attains in the elucidation of the theory, the foot occupying the position of secretory and excretory organ at one and the same time. The development and histologic conditions of the feet, therefore, may serve as an index of the sanguineal-glandular function of the neuroglia.

The author reviews the work on the ontogenesis of the glial foot, naming Held, Rubaschkin, da Fano and especially Cajal who, in a late work, has shown that as soon as vessels appear in the central nervous system glial feet are seen to be formed at the expense of the peripheral prolongations of the epithelial neuroglia, or sometimes at the expense of collateral branches of the peripheral prolongations mentioned.

The author also draws attention to his work on the Ammon's horn where he has stated that the attraction evidently exercised by the vascular system on the glial protoplasm resulting in the formation of feet was manifested not merely on the entrance of the vessels into the nervous structure, but also later, when the vascular system is completely organized (as in a cat of 10 days), glial cells are seen polarized, with their prolongations directed to the surface, that is, to the mesodermic tissue of the pia mater so that their prolongations pass over the vessels without the insertion of feet.

Therefore, the positive attraction of the mesodermal tissue of the pia mater surpasses decidedly at this phase of development the influence which the walls of the vessels exercise on the glial protoplasm, which influence at a later stage becomes predominating. It is then a question as to whether the walls of the vessels or the glial protoplasma are deficient, at this time, in some element necessary for their contact. The author suggests that the vessel walls are not complete at this time.

The author's research is directed to the study of the development of the neuroglia in the different vertebrate groups, with special attention directed to the relations of the vessels and the glia.

He has used two methods only, the Cajal gold method and the tannin-silver method. The *Cyprinus auratus, Labrax lupus, Rana esculenta, Lacerta viridis, Fringella coelebs, Anax* and to a limited extent, the *Amphioxus* were studied by the author.

The author resumes his work in the consideration of these four points:

1. The glia before the appearance of the vascular "feet," the vascular feet of a transitional type and the terminal feet.

In the fish studied by the author, vascular "feet" are not present, although the glia cells are present in numbers around the vessels, and the vascular system is well developed. The ependymal glia traverses the tissues and is implanted on the pia mater. The development of the ependymal glial system is so great and the cells so abundant in protoplasm that one is tempted to admit the existence of a real ependymal gland as such an enormous development could scarcely be considered necessary for the support of the optic roof. The optic lobes in addition possess an external perforative system that is completely independent of the ependymal system. The glial feet implanted on the pia stain perfectly with both gold and silver-tannin methods and are certainly homologous with the glial feet attached to the vessels.

In the Rana esculenta the transitional foot appears. The glial architectonic is the same as in the fish and the relations of the glia to the pia mater are unchanged, but in addition small rounded or fusiform enlargements of glia are seen placed on the vessels in passing over them.

The lizard shows an enormous development of the glial vascular feet although the gliatectonic is still principally epithelial and radiated. But the lizard shows an intermediate stage of glial architectonic as the autonomous development of the feet is in the thalamus opticus and some median nuclei, so that it would seem probable that the evolution of the feet begins in these areas. Intermediate forms are also seen in the lizard, but the majority are terminal.

In the birds studied the relations of glia and vessels are very close and the glia is autonomous. The glial feet are attached to a large part of the vascular surface and form a complete sheath about the vessels. The feet and the sheath present a finely reticulated and vacuolated structure showing that they are not merely for support, but are functional in character. Some of the vascular feet in the bird are elongated and terminate in cones of implantation.

2. Ependymal and autonomous neuroglia.

The author calls attention to the nomenclature in order to draw attention to the ependymal origin of the autonomous glia. The transition from one type to the other is particularly well seen in the lizard. Small autonomous cells, the ependymal glia inserting feet on the vessels and cells detaching themselves from the ependyma and becoming autonomous are seen. In the fish the transitional elements are few, but in the cerebellum examples are seen of the detachment of the ependymal cells.

The evolution of the neuroglia follows and perhaps contributes to the development of the nervous system, a fact that suffices to attribute another rôle to the neuroglia than that of support.

3. Satellite cells and the third element, nonglial (of Cajal, etc.).

The author refers to the recent work of Cajal in which he treats of the real neuroglial satellites and their relations to the nerve cells, and also of the adendritic cells. The author states that a like disposition is not constant in all vertebrates. When the neuroglia is not yet autonomous the satellite

cells could not be expected to appear, but even in the lizard when there is an abundant supply of autonomous glia, the satellite cells are not seen. In the *Cyprinus* the author has seen a small number of glial satellites.

The adendritic cells are not seen in the lower fish organisms but are seen first in the white commissures and the optic chiasm of the lizard. It is to be noted that the close relations of the glia to the vessels are first seen abundantly in the same area. If the theory of Cajal and the author is correct, that the adendritic cells originate from the vessel walls or their adventitial sheaths and if, as the author supposes, the tendency of the glia to approach the vessels is due to some change in their walls, it may be that the two facts noted above have a certain relation to each other.

4. Protoplasmatic glia.

Through the studies of Cajal, Golgi, etc., it is known that the ependymal or epithelial glia changes its aspect in passing through nervous structures of different consistency in turn becoming stiff or fibrous, or becoming velvety and protoplasmatic. Müller's cells in the retina furnish the best example, but the same modifications are seen also in the spinal cord and in the encephalon of the amphibia and the reptiles. For instance in the optic roof of the lizard near the ependyma the cells present a vacuolated, protoplasmatic structure; abundant transverse spinous ramifications contribute to the protoplasmatic character of the cell.

The distinction between protoplasmatic and fibrous cells is most important, however, in the autonomic glial system; for the researches of the author and of Cajal show that the persistence in adult age of protoplasmatic cells is a characteristic correlative with the progressive development of the cerebral cortex in the animal series. One must recollect then that the rabbit, the cat, and even the dog, do not present this type of cell well developed. Also in fish the autonomic cells are of a very simple and primitive type; in the optic lobes, at least, they are frankly fibrous.

The lizard shows autonomic protoplasmatic cells, but much like the embryonal cells in the new-born cat. The cells are poor in protoplasma and frequently polarized and no vacuoles are seen. On the other hand, the birds show a structure very like that seen in man. The relations of vessels and glia are correspondingly close in the birds and the impression of a glandular structure is given.

The author considers his work has strengthened the theory that the neuroglia is an endocrinic gland, probably in part, at least, from the beginning of the formation of the neural lobe, pouring its secretion into the tube itself, which at a certain stage of development would open externally by means of a neuropore.

The aspect of the ependymal epithelia in the *Amphioxus* and especially in fish tends to this hypothesis, and the fact that several glands such as the epiphysis and the epithelia of the choroid plexus are developed from the neural tube renders the idea not unnatural. The extraordinary development of the ependyma in certain parts of the encephalon suggests the condensation of this structure into an individualized organ.

Cajal, accepting Achucarro's theory that the epithelial neuroglia of the lower vertebrates is a tubular ependymal gland, attributes to this structure an important rôle in the elaboration of the nutritive milieu of the nervous elements. The ependymal gland and space would thus form the most important source of nutrition for the neurons whose bodies would thus be forced

not to abandon the neighborhood of the ependyma and therefore their form would be monopolar. This is the case in the nervous system of the *Amphioxus* and in a different situation it holds true of the monopolar cells of the vertebrates although here the nutritive source is not cerebral, but peripheral at the surface of contact of the ganglions and the mesodermic tissue.

The penetration of the blood vessels into the nervous system of vertebrates of a higher order and the vascular evolution of the glia would allow the neurons to abandon their position in touch with the ependyma or with the periphery, and would permit them to adopt bipolar or stellar forms best adapted to their associative functions.

Two movements in evolution contribute in transforming the glia into a definite vascular gland; first, the insertion of peripheral or mesodermal prolongations of the ependyma on blood vessels; second, the emigration and autonomic transformation of the neuroglia. These two facts provoked, perhaps, by the insufficiency of the nutritive relations of the epithelia with the mesoderm coincident with the increased thickness of the walls of the neural tube at certain points (encephalon) suffice to place the glia, on the one hand, in contact with the vascular system of the nervous centers, and on the other hand, to detach it from its connections with the ependyma.

To admit the secretory functions of the neuroglia, basing the theory on histologic findings, a protoplasmatic structure, young and not fibrous, must be recognized in the cells. Such a structure is plainly seen in the human brain and in that of birds.

The protoplasmatic character alone gives belief in the secretory function and although it is generally admitted that even the fibrous cells are covered with a certain amount of protoplasm, still one must recognize that the secretory function of the neuroglia has developed principally in certain parts of the nervous system and must attain a different grade of importance in different species.

Some light may be thrown on the functions of the neuroglia by the establishment of a histologic fact occurring late in evolution: the close relations of neuroglial satellites to the nerve cells. Thus the neuroglia constitutes an important line of connection between nerve cells and blood vessels. This fact must be of great importance functionally; the neuroglia thus facilitates the nutritive processes of the nerve cells and probably is a factor in the development of the nervous system.

But if with Nageotte, Mawas, Cajal and the author (Achucarro) one attributes an internal secretion to the neuroglia, it must also be admitted that this internal secretion, thanks to the close connection of its producing organ with the nervous elements, must have some function in relation with the specific functions of the nervous system and especially of the gray substance.

Now we know that associative nervous activity produces of itself a certain physical reaction and that this reaction is immensely heightened in processes of affective nature, so-called emotions.

The somatic reaction on the vasomotor muscles, on the glands, particularly, and also on the respiratory muscles and on the muscles of the skeleton is so well known and studied that it is not necessary to insist on its importance. In fact the theories of James and Lange, that the essential and causal moment of the emotions consists in the somatic reactions, has not been entirely abandoned. Whether one accepts this hypothesis, explaining the origin of the emotions or not, one is obliged to admit that perhaps the most essential character of what we call emotions is the physical reaction.

Recent investigations, those of Cannon in particular, have shown the importance of the changes in the composition of the blood in emotions, especially in the action of sugar and epinephrin. It seems to be proved that there is a hyperactivity of the suprarenal glands in emotional states. On the other hand, much more distant studies and the modern studies of Crile admit the stimulation of the activity of the thyroid gland in emotions. Thus two endocrine organs are seen to function in an abnormal manner in the emotions and in relation with respiratory and vasomotor manifestations, which are in turn emotional reactions of such a very sensitive and subtle character that if they are perceived in a subjective manner they are already betrayed by physical symptoms. Apparently these phenomena of expression are as intimately allied to affective psychic processes and in a manner as constant as sensory excitations are to sensations. It would, therefore, seem justified to admit as a working hypothesis that protoplasmatic neuroglia considered as glandular by its structure and its vascular relations, placed in intimate contact on the one hand with the associative nerve elements and on the other hand with the vessels, may act at certain moments of nervous activity and pour hormones into the blood which would serve to set free other endocrinic manifestations essential to the emotions (hyperthyroidism and hyperadrenalism).

NOTES ON THE STRUCTURE AND FUNCTIONS OF THE NEUROGLIA AND IN PARTICULAR OF THE NEUROGLIA OF THE HUMAN CEREBRAL CORTEX. N. Achucarro, Trab. d. lab. de invest. biol. Univ. de Madrid **11**:187, 1914.

The author reviews the specific theories of Weigert, Golgi, Cajal, Lugaro and Nageotte on the functions of the neuroglia. The theories of these men are: Weigert: The neuroglia fills up the interstices between the nerve elements. Golgi: The neuroglia extracts nutritive substances from the blood vessels (by means of glial "feet") and carries them to the nerve cells. Cajal: The neuroglia acts as insulator for the nerve tissues. Lugaro: The neuroglia exercises a double antitoxic function, toward the blood and toward the nerve cells. Nageotte: The neuroglia forms an interstitial gland.

The author formulates the following conclusions derived from his own special methods of fixing and staining the tissues:

1. The neuroglial net (syncytium) described by many (Held, and others) is not shown by the author's tannin-silver method.

2. The protoplasmatic glia cells of the cortex show great numbers of branches which cross at times, but this ramification has not been shown to anastomose.

3. Cajal's method of nitrate of uranium and silver shows pictures similar to Achucarro's. Imperfect stains show a reticulum somewhat like that described by Held, and others, but this reticulum is not in the least like the protoplasmatic ramifications of neuroglia shown in the perfect preparations.

4. Glial protoplasm contains certain granules stained by the silver-tannin method, which stains the mitochondria of other organs brilliantly. Therefore, the granules in the glia may be considered as mitochondria of glia.

5. A certain opposition exists in the number of fibers and the number of mitochondria in glia cells of the cortex. Fibrous transformation of the protoplasmatic cells implies a certain involution of the protoplasmatic activity of the glia, attributing importance to the granules (which have disappeared as fibers are formed).

6. The glial feet stain very perfectly by the nitrate of uranium and silver method. Some feet are seen to send fibers across to the opposite side of the vessel and much beyond it. No continuous membrane is shown to be formed by "feet."

7. The functions of the neuroglia are multiple. The neuroglia assists in breaking down nerve tissue (Alzheimer, Jakob, etc.), in forming scar tissue, and it acts as a support in its fibrous stage. It acts as insulator for the nerve tissues and probably has a secretory function. This secretion may be in relation to the functioning of the nervous system, on the one hand, and in relation to the vessels, on the other, constituting an internal secretion.

CONTRIBUTION TO THE STUDY OF THE NEUROGLIAL ARCHITECTONIC OF THE CEREBRAL CORTEX OF AMMON'S HORN AND OF THE FASCIA DENTATA. N. ACHUCARRO, Trab. d. lab. de invest. biol. Univ. de Madrid **12**:229, 1914.

The author notes the studies already made on the architectonics of nerve cells, fibers and blood vessels, which show that each system is organized in a distinct manner in reference to the architectonics of the other elements. Analogy suggests that the same would hold true of the neuroglia. The one-sidedness of the fiber methods used mainly in the study of the neuroglia up to the present time is mentioned by the author.

His method of tannin-silver is given: Blocks of tissue not exceeding 2 to 3 mm. are fixed from two to three days in a solution of 20 per cent. formol to which sufficient ammonium has been added to make the reaction alkaline. Sections should not be more than 10 mm. thick.

1. Mordant the sections in 10 per cent. aqueous solution of pure tannic acid, in a thermostat at 60 degrees for ten minutes, not allowing bubbles to form.

2. Wash well, after cooling, in aqua distillata, with two drops of ammonia.

3. Impregnate in Bielschowsky's silver solution much diluted (3 to 4 drops of solution after precipitate is dissolved, in 10 c.c. water), section by section removing each as soon as the white substance begins to be stained.

4. Reduce in formol solution, prepared as for fixation, for five minutes. After washing the sections may be gilded, then dehydrated and mounted as usual.

The author gives these reasons why the study of the architectonic of the glia is of great value in pathology:

1. The neuroglia reacts very strongly in pathologic conditions and the protoplasmatic cells are frequently transformed into fibrous cells.

2. Certain cortical zones contain only protoplasmatic cells in normal conditions.

3. Certain zones that are protoplasmatic in man are frankly fibrous in the animals customarily used for experiment.

The author's results are:

1. The neuroglial architectonic existing in man and in the monkey, in Ammon's horn and the dentata fascia, corresponds to the stratification of the neuronic structures.

2. In man and monkey in the layers of the stratum lucidum, stratum radiatum and the molecular layer of the fascia dentata the protoplasmatic glial elements predominate, in contrast to the predominence of fibrous elements seen in the dog, cat and adult rabbit.

3. In man, monkey, dog and cat the superficial prolongations of the ependymal cells are not seen in the gold method, but in the rabbit and the new-born cat they are seen in abundance.

4. The irregularities in the course of the ependymal fibers are caused in part by the course of the subependymal vessels, which through mechanical or other unknown reasons carry the fibers and even ependymal cells with them in their course.

5. In some cells in the cat and constantly in the rabbit certain intensely staining granules are seen (in the gold method) which are probably normal components of the glial cells.

6. The perforating fibers in the fascia dentata constitute an embryonal structure that disappears in the adult. They can still be seen in a child of 3 years. In the 10 days old cat these fibers are of great importance, at 3 months they have atrophied considerably, and in the adult cat they have practically disappeared.

7. The cells with perforating fibers lie in the layer of polymorphous cells and in the granular layer of the fascia dentata. Their deep or ependymal prolongations are seen only in some cells of the new-born cat.

8. In the new-born cat scarcely a trace of fibrous transformation of the astrocytes is seen. The polarization of the cells is marked, especially at the level of the stratum radiatum, whence the protoplasmatic pole is always directed toward the surface.

9. The cellular polarization persists in the adult rabbit, and decreases in the dog, cat, monkey and man.

10. Stimulation originating in the vascular apparatus probably collaborates in the definite polarization of the glia cell, and it is probable that the greater polarization of the glia cells in the white matter is determined by the large dimensions of the vascular meshes, which in its turn determines the unilateralness of the attractive stimuli of the neuroglial protoplasm.

11. In the points of contact and adhesion of the two convolutions (fascia dentata and hippocampus) marked variations of the marginal gliatectonic is produced, due probably to the penetration of important vessels and to the development of the Ammon's horn structure. Notable variations in the gliatectonic takes place also at the level of the ependyma through the penetration and division of the vessels.

ALTERATIONS OF THE SUPERIOR CERVICAL SYMPATHETIC GANGLION IN SOME MENTAL DISEASES. N. Achucarro, Trab. d. lab. de invest. biol. Univ. de Madrid **12**:55 (May) 1914.

The author reviews the histologic work done on the ganglions and also the small amount of research in pathologic conditions, instancing Angiolella's work in general paralysis, Laignel-Lavastine's in Korsakow's disease, Weber's in epilepsy, Spratling and Roswell Park's in senile dementia, G. Sala's in general paralysis with Argyll Robertson syndrome, etc.

The author emphasizes the modern theories of the relation between the sympathetic system and mental processes, and calls attention to the action of the superior cervical ganglions in the innervations of the blood vessels of the central nervous system.

The author's present studies have been made with a variety of stains: toluidin blue, light green, Heidenhain's hematoxylin, etc., but the results to be reported were obtained entirely from Cajal's silver nitrate method, with fixation in ammoniated alcohol.

Two cases of senile dementia, one of arteriosclerotic dementia, two of dementia paralytica, one of juvenile general paralysis, one of Korsakow's, one of epilepsy, and one case of hypothyroidism in a young patient were studied.

Certain difficulties in the research were encountered as no equivalent picture was found equalling the Nissl structure in the cortex.

Notwithstanding these difficulties, two elements at least vary sufficiently in the various diseases to be worthy of study. These elements are the pericellular tangles and the structures of the protoplasm and morphology and structure of the dendritic prolongations.

Cajal considers these pericellular fibrillary tangles as abnormal although not of necessity caused by any diseased condition. They are in his view either results of degeneration or of attempts at regeneration. The author's researches bear out this view. He notes hypertrophy of the fibers of the tangles, formation of rings of fibrils, variation of the tangles in number and also in the complexity and in the number of turns of their spirals. A second histologic alteration is a degeneration of the protoplasm of the cell with vacuolization. The process extends to the protoplasmatic dendrites.

After citing these alterations in the various diseases studied, the author concludes that the tangles or spirals are abnormal and that they vary in number and in size in pathologic states. The vacuolization also varies in extent sometimes passing on to complete destruction of the cell. Vacuolization to an extreme degree was noted in Korsakow's disease. The pericellular fibrillary tangles were profuse in general paralysis and exceptionally so in epileptic degeneration.

THE CORTEX IN CEREBRAL PARALYSIS. N. Achucarro and M. Gayarre, Trab. d. lab. de invest. biol. Univ. de Madrid **12**:1 (May) 1914.

1. The gold method of Cajal is especially adequate for histopathologic investigations on account of the extent and constancy of its staining properties.

2. The cortical astrocytes undergo alterations in their structure, in general paralysis, resulting in the disappearance of their spongioplasm and the diminution of the gliosomes.

3. The hypertrophy of the cortical astrocytes implies a simplification of the protoplasmatic ramification. While some branches are much thickened, others become pale, atrophic and fragmentary.

4. Neuroglial cells terminating in expansions, rounded or club-like, are frequent in general paralysis.

5. (Klasmatodendrosis of Cajal.) Fragmentation of the glial dendrites is common in general paralysis and results in some cases in the formation of ameboid cells and also of "full Körperchen" of Alzheimer.

6. The process of fragmentation does not intervene in the formation of the small ameboid cells close to the nerve cells. The latter cells stain with gold and differ from the adendritic cells of Cajal which do not take the gold.

7. The connection of the glial satellites with the nerve cells becomes closer in general paralysis, the glial cells forming more or less continuous sheaths. The satellites are distinguished in three groups, those of the base, of the neck and of the trunk of the nerve cells, together forming the sheaths.

8. Although the adaptation of the glial cells to the nerve cells is very close, the nuclei of the glia cells remain round and never become so large as those of the rod cells.

9. The rod cells in general paralysis as in rabies do not stain by the gold method. These results and those of the silver-tannin method, which is so elective for connective tissue, tend to show that the greater part of the red cells are mesodermal in origin, coming from the vessels, and, according to the authors' opinions, migratory in habit. They cite the irregular curved forms which Alzheimer calls transitional as evidence of a drawing away from the point of origin and assume that the cell only becomes a complete rod cell when freed entirely from its origin.

CONTRIBUTION TO THE STUDY OF THE NEUROGLIA IN THE HUMAN CORTEX IN SENILE DEMENTIA AND OF THE PARTICIPATION OF THE NEUROGLIA IN THE CELLULAR ALTERATION DESCRIBED BY ALZHEIMER (ALZHEIMER'S TANGLES). N. ACHUCARRO and M. GAYARRE, Trab. d. lab. de invest. biol. Univ. de Madrid **12**:67, 1914.

The authors take as their point of departure Alzheimer's classical description: "In the interior of a cell, which appears otherwise normal, one or several fibers appear unusually clearly on account of their special thickness or their density of impregnation. At a later state many adjacent fibrils alter in the same manner and thus form thick bundles that finally appear on the surface of the cell. Finally, the cell with the nucleus is entirely destroyed and the point where the cell lay is indicated by a bundle of fibers rolled up into a spiral." Alzheimer also noted that chemical changes, shown by staining reactions, accompanied the morphologic alterations. The authors then cite the work of observers who are not in agreement with Alzheimer's theory: Bonfiglio, Donaggio, Marinesco, Cajal, Tello and Achucarro. They discuss particularly Achucarro's work of 1910, in which he showed that fibrillary "baskets" were formed by glial elements and at times were rolled around the nerve cells; he concluded at that time that some (not necessarily all) of the "tangles" in Alzheimer's disease had their origin in the neuroglia. Bielschowsky advanced the same idea later, drawing his conclusions from the similarity of certain vascular connective tissue changes to the Alzheimer lesions. Simchowicz is cited as the most open opponent of the ideas of Alzheimer. Simchowicz was not acquainted with the work of the Spanish school, but came to the conclusions, from his investigations, that the tangles were in all probability neuroglial in origin, but at all events that they were found outside the nerve cell. The authors do not consider Simchowicz' theory, that all tangles are neuroglial, proved since to prove the nuroglial origin of the tangles, it would be necessary to show continuity of the tangles with the prolongations of some glial cell. This phenomenon has not yet been demonstrated, Achucarro's work showing only that structures resembling the Alzheimer tangles can originate from changes in the neuroglia. The difference in chemical constituency of the glial cell and the tangles has been offered as an explanation of the apparent lack of continuity, but the fact that Bielschowsky's method stains both elements and yet no connection is seen between them, speaks against this supposition. The author's results with Cajal's gold method form an argument against the neuroglial origin of the Alzheimer baskets and tangles.

The gold method stains the neuroglia intensely, but the neuronic elements are also stained a deep rose or violet color and the skeins or tangles of Alzheimer are palely perceptible. In pictures shown by this method, however, the neuroglia appears to act in the ordinary manner, passing over and around the nerve cells, sometimes passing through the meshes of the "tangles,"

but never taking any part in their formation. From time to time, however, structures very similar to the Alzheimer lesions are seen, but on close observation a glial nucleus can be found in the midst of the fibrillary tangle. These elements stain intensely with all silver and gold stains, whereas the tangles of neuro-fibrillary origin stain palely with the gold method.

After citing many cases and conditions observed the authors conclude that: 1. In senile dementia the glial elements undergo alterations that may give origin to figures similar to Alzheimer tangles. 2. Cajal's gold method gives no indication that the neuroglia takes any considerable part in the formation of the typical Alzheimer changes, and still less that the tangles are exclusively of neuroglial origin. 3. The Alzheimer figures resemble, more than anything else, the phenomena observed by Cajal after section of the central axon, when globular masses are formed at the peripheral extremity very similar to the spirals or tangles. Cajal considers them agonal formations. 4. Alzheimer's phenomenon is essentially a retrograde and agonal manifestation of the nerve cell, in whose terminal stage a special incrustation exists that may attack neuroglial structures. 5. In the final phases of Alzheimer's phenomenon portions of the cell undergo a process of excision and remain separated from the rest of the cell.

GURD, Ann Arbor Mich.

(*To be continued.*)

AUTONOMIE DE LA MOELLE CONSECUTIVE A LA SECTION COMPLETE DE L'AXE SPINAL. G. MARINESCO, Rev. neurol. **35**:257 (April) 1919.

For a long time before the war, the foremost theory in regard to the autonomy of the spinal cord separated from the brain, was that of the distinguished English neurologist, Bastian, who stated that complete section of the spinal cord at the level of the upper dorsal and lower cervical region produced total paralysis of the lower limbs and abdominal muscles, disappearance of feeling below the lesion and loss of the cremasteric and abdominal reflexes and also loss of the tendinous reflexes, the only reflex still persisting being a slight movement of the toes after deep pricking. This theory had many supporters in France, Germany and England.

The neurology of war, however, has brought to hand new material which makes us believe that the spinal cord severed from its connections with the brain has an independent activity. On close examination we find that the cases published by Bastian and his followers to support his theory are open to discussion. To be valid, the following conditions should be true: first, the patient should live long enough to allow the spinal cord to regain its own activity, that is, from four weeks to several months; second, the elements of the reflex activity should be intact—radicular cells, motor nerves and muscles. Electric examination can inform us of the state of nerve and muscle. Third, we should have accurate details on the condition of the radicular cells in connection with the patellar and Achilles' reflexes; fourth, of the condition of the motor nerves of the crural quadriceps and of the triceps surae; and, fifth, we should know the histologic condition of the quadriceps and especially of the vastus internus muscle.

In none of the observations published by Bastian or his followers are all of these conditions fulfilled. Many times they are cases of compression of the spinal cord rather than of true spinal transsection. In the opinion of the author these observations show definitely only two things: that superficial

and deep reflexes disappear immediately after the complete section of the spinal cord, and that it is possible for this disappearance to persist ultimately because some part of the reflex arc has been injured.

Opposed to the theory of Bastian, we now have a number of facts which show that the isolated spinal cord does regain a reflex activity after a certain length of time; namely, material presented by Kausch, George Riddoch, Lhermitte and Roussy and a case of M. Poussepe's in Petrograd which six months after the operation for suture of the meninges showed important modifications: pinching the dorsal surface of the foot was followed by a movement of triple contraction of the legs on both sides. In this movement of contraction, the tonus of the shortening muscles was exaggerated. To this movement of triple contraction of the excited member there corresponded a movement of crossed extension produced in an almost constant manner.

It is unquestionably true that the sectioned spinal cord after a certain time regains its own activity which is not a continuation of the old but a new and lower activity, lacking the activity posture and reproducing in only a rudimentary way the activity of the lower animals. It is manifested in the reappearance of the tendinous and of some defensive reflexes and the return of their tonus. The extensor muscles, which depend on the supramedullary centers, do not regain their reflex activity. It all falls within the province of the flexors.

The first question, that is, the question of the nature of this activity, the writer discusses by an examination of its fundamental characteristic, tonus, so unequally distributed in the flexor and extensor muscles. It might be called the expression of a stimulation which gives birth to a slight tetanus. It is physiochemical rather than physiologic in nature, for chemical phenomena such as nutritive exchanges do take place, though they are very small, thus accounting for any absence of fatigue. To better understand the delicate mechanism of tonus, the author here discusses the researches of Botozzi on physiologic tetanus which led him to the belief in the dualism of the substratum of the muscle substances—sarcoplasm, the seat of tonic, and the muscle fiber, the seat of clonic contraction.

Many experiments have been made on the condition of the current of action in muscular contraction. We have Pipper's theory of voluntary innervation; that each muscular fiber involved in tetanus is traversed each second by fifty waves of contraction. There is an accordance between the impulsions in the nerve and in the muscle. He also shows that the normal rhythm of innervation is a coefficient of the temperature. The oscillations increase with the temperature, as is shown in an interesting experiment on the muscles of cold-blooded and warm-blooded animals. These have the same rhythm if the temperature is equal. There is, then, a general law for the current of action or waves of negativity in the animal series.

When the tonus is modified, modifications in the central nervous system would extend to the electric phenomena of the nervous influx. These oscillations, we find, diminish in number in the case of hypertonia as in that of hypotonia, but this again is always followed by a lowering of temperature.

DuBois-Raymond has always stood as authority in experiments in electrophysiology and was the first to try to determine the mathematical formula in his attempt to relate the muscular contraction to the intensity of the stimulation. But, after all, what is important, is not the strength of the intensity of the current, but the speed of excitability of the muscle, the rapidity with which the intensity of the constant current is attained and suppressed: "chronaxia," as M. Lapicque calls it, which is a constant of time.

He defines it more accurately a little further on as the inverse of the speed of excitability. The muscle and its corresponding motor nerve have the same chronaxias, are isochronal. When a nerve and muscle are isochronal, any disagreement in their chronaxias makes difficult their harmonious action. When the chronaxias are unequal, the nerve stimulation is transmitted with more and more difficulty to the muscle; when the harmony of the chronaxias is equal to one half, the stimulation of the nerve is no longer transmitted. In partial hemiplegia the chronaxia of the muscles is slightly altered. It is increased in muscles contracted in hemiplegia; the temperature is also lowered. Chronaxia is a function of temperature. In sections of the spinal cord, chronaxia is altered, since the temperature of the muscles of the lower limbs is decreased and the tonus changed.

The writer believes that in the activity of the spinal cord freed from its connections with the brain, we have to deal, not merely with the phenomena of shock, though the suppression of certain cerebral organs may account for the degeneration of the radicular cells, but with modifications of a physical order as well, such as differences in superficial pressure of the cells and in electric potential. These physical modifications: superficial pressure, electric potential and heat, bear strongly on chronaxia and destroy the harmony that exists between the synapses of the higher centers and the medullary nerves. Therefore he thinks that the spinal cord separated from its connections with the brain, shows after a certain period an activity of its own. It is the seat of elementary reflex phenomena, but this lower activity is abnormal and does not correspond to the activity of the lower animals; the agreement between the neurons of the flexor muscles and the sensitive neurons has returned, which accounts for the movement of triple contraction mentioned in the case of M. Poussepe, a trace of a coordinating mechanism of the swimming movements of the duck. But the agreement between the extensors, which depend for innervation on the higher centers, and their corresponding neurons, no longer exists. They do not regain their reflex activity. Their tonus does not return to normal.

The fact that we are dealing with a new activity of the spinal cord does not mean that regeneration of the sectioned fibers does not go on. It has been proved that these fibers do possess the capacity for regeneration. But this does not assure the return of any useful connections with the brain, nor does it explain all the activity of the sectioned spinal cord. It is the activity of the flexors and their neurons, the return of their tonus, and the lowering of temperature of all the muscles, that make the writer believe that we have to deal with a new and autonomous activity of the spinal cord, shown by defensive movements, so ill-adapted, however, that they cannot be classed with the true reflexes of defense of the lower animals.

JONES, Detroit.

TRAUMATIC NEUROSIS AND TRAUMATIC HYSTERIA. MICHAEL OSNATO, Neurol. Bull. **2**:334 (Sept.) 1919.

Osnato bases his study of traumatic neurosis on a series of 102 cases which were for a long time under his care in connection with the State Industrial Commission of New York. The vast majority of his patients were married men, most of whom received some injury to the head; more than half were unconscious following the accident, and nearly all showed marked emotion of fear at the time of the injury and more than 80 per cent. immediately developed "nervous" symptoms. The most common symptom complained of was

sleeplessness, frequently alternating with terrifying dreams; diffuse headache was another common complaint; and dizziness (not true vertigo) completed the usual picture. Physically the examinations were invariably negative, except for lively reflexes; and endocrinologically the author was unable to detect any incriminating evidence. Mentally the patients uniformly showed mild depression or anxiety, many of them betraying facial expressions of fear and exhaustion.

Osnato insists that most of his patients were previously normal; they betrayed no true mental abnormality during the periods of their incapacity. Most of them had no apparent reason for prolonging their illness, certainly not for pecuniary reasons, as the compensations they received were invariably less than they could have earned by going back to work. The author is firmly of the opinion that persons suffering from traumatic neuroses have sustained real injuries, and he seeks a causal explanation in anatomico-physiologic and psychologic substrata.

He refers to Mott's investigations of the functional nervous conditions of the war, to Pike and Coombs' study of traumatic shock, to Crile's description of structural changes in the brains of animals and persons subjected to prolonged fear, and to Cannon's researches on shock; but Osnato is not convinced that anatomicophysiologic explanations are sufficient to account for the traumatic neuroses that he encountered in his civilian practice. He therefore turns to psychologic considerations and finds in MacDougall's conception of the instincts and their emotions a truer explanation of the genesis of traumatic neuroses. The crux, as Osnato sees it, is this: The injury is accompanied by intense emotion (fear); but soon this emotion ceases to be associated directly with the accident and becomes attached, perhaps by a circuitous route, with other psychic processes which may have had some relation with the original excitant of the fear reaction but which no longer stand in direct or indirect relation, and cannot even be recalled by the patient to have had such a relation. In terms of physiology one may find an analogy in Pavlow's conditional reflex.

As most of the cases resulted in litigation they were followed up after settlement and of twenty-five cases investigated, twenty-one had apparently recovered. Osnato thinks that trauma can produce functional nervous disease in persons who had previously had no mental ills, and he deems it wise to make early and suitable settlements lest the neurosis become fixed and adjustment impossible.

Referring to the traumatic hysterias, Osnato calls attention to the fact that while the immediate causal factors were similar in them and the neuroses the patients were of different mental stuff and therefore reacted differently. He studied seventy-three patients; most of them had previous mental abnormalities, frequently difficulties in the sex or social life. One point of difference was that in traumatic hysteria the symptoms gradually grew worse up to the time of settlement, then slowly receded. The symptoms, and particularly the common signs of hysteria, were not amenable to treatment before settlement. Psychologically, the hysterics differed in that many were emotionally unstable, asocial, sensitive, selfish and below normal mentally. Their complaints were not genuine, they were insincere and tried to misrepresent. Frequently it was difficult to differentiate them from true malingerers particularly so as the causative mechanism lay close to the surface. In nearly all cases the desire to obtain a settlement motivated the syndrome.

By way of illustration the histories of eight cases are detailed in which previously existing social or sexual maladjustments, and not the accident, conditioned the hysterical manifestation.

Osnato concludes that in the traumatic neuroses one deals with normal persons whose symptoms are brought on by the accident and fear, and who actually suffer a psychophysical depression, while in the traumatic hysterias the accident is merely an "excuse" for bringing to a head previously maladjusted instincts. In the opinion of the author, one never sees true hysterical stigmas in the traumatic neuroses.

In the study of his cases Osnato has attempted to distinguish two distinct clinical manifestations, each silhouetted against distinct personality backgrounds.

WECHSLER, New York.

AN ACUTE EXHAUSTION DREAM STATE WITH PSYCHANALYTIC INVESTIGATION. PROF. GIOVANNI MARRO, Lieutenant-Colonel, Consulting Neuropsychiatrist, Military Hospital Grenoble, Arch. di antrop. crim. **39**: Pt. 3-4, 161, 1918-1919.

The patient was an interned Austrian capitalist of great power and wealth captured by the Italian troops with the surrender of Monfalcone in 1915. He was interned in Alexandria and allowed considerable liberty. A former sweetheart from Turin came to see him, and for three "days and nights they abandoned themselves to great sexual excesses." After the departure of the woman the patient became nauseated and vomited and had fever with much sweating. He drank a good deal of water but took hardly any food for several days. He refused medical attention. Eight days after he had first seen his sweetheart he awoke early in the morning, took a train to Turin, visited her there, rented a small apartment and then went to the police notifying them that he had chosen Turin as a residence with the consent of the authorities in Alexandria. Asked why he desired this change he stated that he "had killed two persons in Alexandria who had broken into his lodgings to revenge themselves on him because he had denounced them as thieves. They tried to kill both him and his host. The authorities had absolved him from blame because of legitimate self defense but advised him to leave Alexandria and go to Turin to live." The authorities in Turin, realizing his abnormal mental state sent him to the insane asylum where he appeared stunned and indignant. He was weak and feverish and resisted but little being put to bed. When seen by the doctor he repeated his story, insisted that peace had been declared between Austria and Italy because his father and mother had visited him in the hospital the night before and told him so. He was imperious in his demands to be set free. His fever left him in a few days, his appetite returned and he was much quieter. Finally one day he exclaimed, "Why, I have dreamed all this."

Before recounting the dreams the author goes into a detailed description of the patient's physical characteristics according to the classifications of physiognomy of Lombroso. After the acute delirial dream state the patient was quite depressed, diffident and apprehensive. He recovered in a month and was discharged.

In the analysis the author recounts six dreams that the patient had. These the author thinks motivated the patient's conduct and controlled his waking state. He believes with De Sanctis that the paranoic dreamer believes absolutely in the reality of his dream states, and he thinks with Macario that

the delirious dream states are so infixed that in medieval days they caused such staunch belief in their reality that sufferers resisted tortures. Discussing the latent content of his patient's six dreams, the author states that the subject was able himself to see points of contact between the meaning of the dreams and his affective life as he was living it, a captive in an enemy country. In his dreams the patient gave free play to his emotions and desires—peace for his fatherland, relief from financial difficulties caused by his position as a prisoner, relief from the agony of seeing and hearing a victorious Italy, etc. His inadaptability, sense of isolation and antagonism resulted in a lack of contact with reality and a flight into his acute exhaustion delirium. The author calls attention to the fact that between each of the six dreams there was a waking period of from a few minutes to a whole day, but the content of the dreams was emotionally so attuned to the patient's personality that it controlled him by subjecting him to the dominance of each separate dream. Each dream completed and dominated the subsequent mental state. In the fifth dream he emerged triumphant and victorious in direct physical combat killing his enemies and surmounting all difficulties. As the patient says "if I was late in persuading myself that the whole thing was a dream, it was because I did not wish to think it was—in fact, I always tried to chase the thought that it was a dream, out of my mind." The freudian explanation is that the dreams were able to control consciousness by eluding the censor because they so nearly identified themselves with the ego.

OSNATO, New York.

ATROPHIE OPTIQUE FAMILLIALE. S. IMAMURA and K. ICHIKAWA, Rev. neurol. **35**:277 (April) 1919.

The authors present two cases of optic atrophy with mental symptoms occurring in brother and sister. Five other siblings did not exhibit a similar condition. The family history was negative and neither parent had suffered a disorder similar to that exhibited in the two cases reported.

The authors give the eye findings and clinical history of the two patients. In both the papillae were rather limited in circumference and pale throughout their extent. There existed an absolute central scotoma of from 30 to 40 degrees in the case of the brother, more extended in the right eye than in the left; and scotoma of from 10 to 15 degrees in both eyes in the case of the sister. There was no contraction of the peripheral visual field.

In the course of hospital treatment for the girl, the papillae showed signs of inflammatory atrophy. Amblyopia slightly increased. In both eyes, a relative scotoma of 10 degrees appeared around the absolute scotoma which remained unchanged. The peripheral limits of the visual field became contracted. The slight change in the absolute scotoma and in amblyopia lead to the conclusion that the disease had reached its terminal stage.

The authors attempt to classify these cases according to the known types of optic atrophy. The opthalmologic picture in both cases reproduces almost exactly the symptoms of hereditary optic atrophy as presented by Leber. But these patients exhibited other neuropsychopathic signs not included in the type of Leber.

In the case of the brother, the lack of coordination of the ocular movements and asymmetry in the innervation of the face, were not sufficiently marked to be important. The first might be a result of the weakened vision; the second, an hereditary defect. Intellectually, he was, to all appearances, normal.

But in the case of the sister, one cannot ignore the following neuropsychopathic symptoms: lack of responsibility, smiling nonchalance, mental slowness, weakened memory, feeble innervation of the right side of the face and appearance of fibrillary tremors on the lips and eyelids during mimic movements. On looking at a distance, one eye turned downward. The convergence was imperfect. Tremors in different parts of the body appeared, exaggerated in the upper members during purposeful movements. There was rigidity in all the members, more marked in the upper body. All movements needing fine coordination were ill adjusted and slow. No ataxic phenomena were present. Romberg's sign was absent. The gait was almost normal. There was no alteration in the deep and superficial reflexes. Mental deterioration began at the time of the appearance of the disease.

In regard to the hereditary optic atrophy of Leber, Hormuth has shown that while dizziness, headache, scintillating scotoma and other symptoms are included, anything of a hemopathic nature, such as epilepsy, is considered an exception. It is doubtful that the authors' case belongs to the type of Leber. Raymond distinguishes Leber's disease from the other optic atrophies, by the name of hereditary optic atrophy of the papilla; the others, he calls, hereditary atrophy of the optic nerve.

There is one type of optic atrophy, however, that includes nervous phenomena and with which we may connect our case. It is a type presented by Behr and Kiel, concerning a series of six children, all boys, who exhibited signs of pyramidal and cerebellar lesions in a slight degree: hypertonia of the limbs, exaggeration of the reflexes, slightly pronounced ataxia, uncertain gait, a touch of nystagmus and weakness of the bladder. The authors call this "complicated infantile familial optic atrophy," as opposed to Leber's type which they call "uncomplicated juvenile familial optic atrophy." Six other cases from the same clinic are added, which present the paracentral scotoma, in all of which the nonprogressive character of the disease is established. All these cases, however, concern only children, and are mostly hereditary, while in the authors' case the symptoms date from the period of puberty. With the accumulation of more material, it is probable that the transition between these two types of Leber and Behr will some day be established.

JONES, Detroit.

CHRONIC NONDEGENERATIVE HEREDITARY CHOREA. I. S. WECHSLER, Neurol. Bull. **2**:329 (Sept.) 1919.

Wechsler describes a case that seems to him to represent a distinct clinical entity although it bears close resemblance to Huntington's chorea.

The patient was an American woman, aged 36, who had been suffering from peculiar movements of the arms, hands, legs and body and twitchings of the face for sixteen years. The movements were intensified by emotion and were said to be present even during sleep. She also complained of peculiar spells of weakness.

Her family history was interesting. Her father had had a chronic chorea for twenty years before his death at 68, which was due to tuberculosis. Mentally he was sound. One brother had "shakings." She had four children: one daughter of 18 had nystagmus; another of 16 had nervous spells; one boy of 9½ had chorea which had lasted for three years; another boy of 6 also had mild chorea which began at the age of 3. None of the patients showed mental deterioration at any time though the chorea had persisted for a number of years.

The woman showed the following signs of chorea: She had a swaying, jerky, irregular gait, the whole body being incoordinate and clownish. Coordination was poor, speech slow and jerky, but not scanning. There were irregular, jerky, purposeless, meaningless, quick movements of whole parts, of arms, legs, body and hands. She could not hold her head in one position, the eyeballs wandering in an irregular, jerky, choreic way. The face showed an occasional grimace and the tongue was quickly jerked back on momentary protrusion. Further neurologic and systemic examinations were negative. The mental status was normal.

The whole picture, Wechsler claims, closely resembles Huntington's chorea though there are a number of points which sharply distinguish the two. There is a hereditary element, three generations showing prolonged chorea, but while his patient undoubtedly had a chronic chorea it was not progressive or degenerative, and therefore he thinks it does not belong to the Huntington type. He ruled out hysteria despite her peculiar spells of weakness, which bore a marked functional stamp, and the intensification of her movements on emotion. Chorea gravidarum and paramyoclonus multiplex are considered only to be dismissed. Chronic perennial chorea, chorea adultorum permanens and chronic intermittent chorea are mentioned merely as descriptive names which Wechsler does not think fit his case.

In view of the fact that the patient's condition was hereditary, chronic, not progressive and not mentally degenerative the author thinks it cannot be considered a Huntington, even though the clinical picture closely resembles it. Whether or not it is a distinct clinical entity, he claims, is an opinion which does not as yet admit of proof.

OSNATO, New York.

CHEMICAL ANALYSES OF TWO PATHOLOGICAL HUMAN BRAINS. C. G. MACARTHUR and E. A. DOISY, Am. J. Insan. **76**:159 (Oct.) 1919.

The authors report the results of analyses of two brains, one from a case of paresis and the other from a case of organic brain disease, probably bulbar paralysis. The Wassermann reaction with the serum from both cases was positive.

For purposes of analysis the brains were divided into cerebrum, cerebellum and brain stem (including medulla, pons, midbrain and thalami). The cerebrum from the case of paresis and the entire brain from the case of bulbar paralysis were analyzed. The results are tabulated together with those from three normal brains. The ages of the pathologic brains were 50 and 51 years and those of the normal brains 33, 35 and 67 years. The tables are arranged to show the constituents in percentages of fresh tissue, in percentages of solids and in weights or constituents in grams. Total solids, phosphatids, cerebrosids, sulphatids, cholesterol, organic and inorganic extractives, lipin, protein, neutral and inorganic sulphur and lipin, protein, organic and inorganic phosphorous were determined. The authors summarize their findings as follows: The principal changes in the cerebrum of the case of paresis were in the lipins and extractives. The substances (cerebrosids) associated most closely with sheath development showed largest losses. The phosphatids and sulphatids are present in smaller amounts than in normal cerebrums. Both organic and inorganic extractives showed marked increases in percentage and absolute amounts. This is to be expected in degenerative changes, if it is the more complex structure substances that alter to simpler compounds which are but partly removed from the tissue.

The changes in the cerebrum in the case of organic brain disease (probably bulbar paralysis) which gave a syphilitic history showed essentially the same kind of changes as the case above; but all were less marked. This would suggest that the alterations were due to the action of spirochetes. The midbrain, medulla and pons exhibited about the same kind of chemical changes as the cerebrum. The cerebrosids, sulphatids and phosphatids, and therefore the total lipins, showed distinct losses. The proteins, water and total solids were nearly normal; but both organic and inorganic extractives were high. Though the data for the cerebellum show variations, they are not supposed to be of pathologic significance.

WESTON, Warren, Pa.

INFLUENCE OF PITUITARY EXTRACTS ON THE GENITAL TRACT. ROBERT T. FRANK, M.D., J. A. M. A. **73**:1764 (Dec. 6) 1919.

The author reports briefly the results obtained from the feeding of pituitary extracts to white rats. Assuming that anterior lobe extracts cause an increase in the growth and stimulation of the genital tract, a series of experiments was conducted in order to determine what constituents of the pituitary extracts produced these phenomena. The portions of the gland experimented on were: Extract No. 1, anterior and posterior lobe in proportion of 1 to 6 desiccated; Extract No. 2, pituitary free from fat soluble substances; Extract No. 3, pituitary containing only fat soluble substances; Extract No. 4, anterior lobe desiccated and diluted with lactose to prevent decomposition.

Six litters of white rats raised in the laboratory were used in the course of these experiments. The rats were 3 weeks old when the experiments were begun. Litters 1 and 2 were each composed of six sisters; Litters 3 and 4 of five sisters each; Litter 5 of three sisters, and Litter 6 of four sisters. At least one animal was selected as control for its group. For thirty-five consecutive days each animal (except the control) was fed 0.05 gm. of pituitary extract, given in a bolus composed of meat, egg and cream cheese, which was eagerly taken. In order to round out the diet, the animals were also fed with milk, greens and oats. Throughout the experiments all the animals, except No. 4 of Litter 6, showed progressive increase in growth.

At necropsy, no concordant increase in size, general body weight or in the genital organs could be found which was ascribable to the glandular feeding. Irrespective of whether or not they were experimental animals or controls, certain rats showed an increase in weight, the presence of corpora lutea in the ovaries and enlargement of the other internal genitals.

In conclusion, the author states that in his opinion further experiments will be necessary to prove that the stimulation of the female sex organs can be ascribed to the use of pituitary extracts. He also emphasizes the danger of using glandular extracts in clinical practice, since laboratory reports have not been confirmed.

ADSON, Rochester, Minn.

THE CEREBROSPINAL FLUID IN MULTIPLE SCLEROSIS. JOSEPH EARLE MOORE, M.D., Arch. Int. Med. **25**:58 (Jan. 15) 1920.

The positive colloidal gold reaction is found in a large number of patients with neurologic disorders of all types. The "paretic" gold curve, supposed to be pathognomonic of general paralysis, has also been obtained in other conditions—lead poisoning, tuberculosis, meningitis, brain tumors and multiple sclerosis; in multiple sclerosis it appears quite regularly, but in the first three conditions it is less regular.

The records of forty cases previously reported present no uniformity; fourteen gave a paretic gold curve, twenty-five were negative, one case was atypical, fourteen showed pleocytosis and in twenty-five cases the globulin was positive. The Wassermann reaction for blood and spinal fluid was negative in all but one case which showed a doubtful reaction.

The author reports twenty cases of multiple sclerosis in which the diagnosis was definite. Eighteen of these showed a definite paretic gold curve and positive globulin reaction. The average is high enough to exclude an occasional finding. In eight cases in which the diagnosis was doubtful no reactions were found, showing that the diagnosis was probably at fault. Therefore, excluding the occasional finding of the paretic gold curve in lead poisoning, tuberculosis, meningitis and brain tumors, there are two conditions — neurosyphilis and multiple sclerosis—in which it is found with constancy. In differentiating these two we have the positive Wassermann reaction in either blood or spinal fluid, with one single exception in long treated cases in which the Wassermann reaction becomes negative before the colloidal gold test.

Therefore, when the clinical evidence points to multiple sclerosis, the spinal fluid picture with a paretic gold curve and positive globulin would be a strong argument in favor of a definite diagnosis of multiple sclerosis.

DeLong, Philadelphia.

TRANSPLANTATIONS TENDINEUSE DANS LA PARALYAIE RADIALE TRAUMATIQUE. Presentation d'un Cas. T. Tarkowsta and H. P. Achard, Rev. neurol. **35**:283 (April) 1919.

The great interest which the war has excited in operations on the nerves, often brilliant and successful, has led us to neglect for the time being, the surgery of the tendons. The authors believe that transplantation of the tendons would be of benefit in many cases where operations on the nerves have originally failed. To draw attention to this field of surgery, they present the following case:

A soldier was wounded July 18, 1919, by a bullet in the left arm, with shattering of flesh, fracture of the lower third of the humerus and immediate radial paralysis. After removing the patient to a hospital, the wound was cleaned and dressed, roentgen-ray pictures taken and the arm immobilized in a plaster cast.

When the cast was removed, about September 14, a complete neurologic examination was made and a diagnosis of radial paralysis with involvement of the supinator longus was reached. Total reaction of degeneration was noted, and hypesthesia in the region of the radial nerve on the dorsal surface of the hand; no tingling could be provoked near the fracture nor below it for the length of the radial nerve. No regeneration of the nerve resulted after months of electric treatment. Under the conditions present in the arm, an operation on the nerves seemed a dubious procedure and the authors resorted to transplantation of the tendons. The operation is described in detail.

Ten days later the plaster cast was opened. The hand was in hyperextension and all effort at bending the hand and fingers caused great suffering and was made difficult by the shortened extensor tendons. However, after several weeks of postoperative treatment, consisting of massage, electric treatment, etc., the patient could grasp even very small objects. The movement of extension appeared quickly, produced first by the elasticity of the common extensor muscle, and later by the action of the transplanted muscles.

The patient continues to progress and can bend and extend the hand with ease, although the movement is still somewhat limited; he can use it for all the ordinary needs of life, bend and extend each finger separately, and touch the other fingers with the thumb.

The technic of different operative methods is discussed and that adopted by the authors explained. They used the three longitudinal, cutaneous incisions, chose the great palmaris and anterior cubital muscles for transplantation and passed from the palmaris to the dorsal surface around the radius and ulna.

They conclude from their observations, that in the case of peripheral paralysis, particularly radial paralysis, recourse may be had to transplantation of the tendons when recuperation of the nerve function is doubtful, and that these transplantations are already sufficiently regulated for successful current usage.

JONES, Detroit.

THE PIGMENTATION OF NERVE CELLS. II. THE LIPOCHROME A PLANT PIGMENT. DAVID H. DOLLEY and FRANCES V. GUTHRIE, J. M. Res. **40**:295 (Sept.) 1919.

From the facts that species whose tissue fat is colored with carotinoids carry the pigments in the bloodstream and that species whose fat is colorless do not carry carotinoid pigments in their serum, except in insignificant traces, the authors constructed the working hypothesis that the fat combined or fat-holding pigment of the nerve cells would be a true plant lipochrome or carotinoid, absorbed with vegetable foods and incorporated in the cell but limited to such species as carry carotinoid in the blood. The blood serum of man contains carotinoid pigments.

Taking up the work of Palmer and his associates on the production of pigment-free egg yolk by the elimination of carotinoid containing food from the diet of the chickens, the authors determined the effects of diet and depression on the lipochrome content of nerve cells. Twelve chickens were used. Six were made carotinoid-free and six carotinoid-full, by adjusting the diets. In three of each set the factor of depression was introduced by the use of morphin, exposure to temperatures of 40 to 45 degrees or by inadequate diet. The chickens which had received a carotinoid-containing diet, including both the normal and the depressed group, showed the presence of yellow pigment. The tissues from the morphin-depressed chickens contained an excessive amount of pigment. No pigment could be demonstrated in the nerve cells of chickens fed a carotinoid-free diet.

It was then necessary to show that the pigment found in the carotinoid-fed chickens was identical with the lipofuscin, "Abnutzung" or fat-holding pigment so frequently described as existing in nerve cells. The authors did this by using the ferric chlorid, hydrogen peroxid, Nile blue and solubility tests. They therefore conclude that the lipochrome pigment of the nerve cells is a plant carotinoid derived from the food and incorporated in the cells but limited to such species as carry carotinods in the blood.

WESTON, Warren, Pa.

A STUDY OF THE COLLOIDAL GOLD REACTION AND ITS CLINICAL INTERPRETATION. MARGARET WARWICK and CHARLES E. NIXON, Arch. Int. Med. **25**:119 (Feb.) 1920.

The authors present a full review of the methods of preparing the colloidal solution and lay especial emphasis on securing exact neutrality. In the study of the cases presented, the blood and spinal fluid Wassermann reaction, the

globulin content of the spinal fluid and the spinal fluid cell count were all carried out in conjunction with the colloidal gold reaction. A cell count, if over 5, was considered pathologic since in the entire series of "miscellaneous" or normal spinal fluids the average cell count was 1.6.

The abridged experiences of twenty-five writers are cited *a priori*. These indicate that the colloidal gold reaction is the most sensitive of all spinal fluid tests, but that it tends to show curves in nonspecific fluids and more rarely fails to show specificity where it exists.

The tests were carried out on all hospital cases suggesting central nervous system involvement of any kind, and on a series of "miscellaneous" hospital cases for control.

In dementia paralytica the colloidal gold test was positive in 94 per cent. and the spinal fluid Wassermann reaction positive in 83 per cent. (eighteen cases).

In tabes dorsalis the colloidal gold test was positive in 80 per cent. and the spinal fluid Wassermann test was positive in 52 per cent. (seventy-four cases).

In cerebrospinal syphilis, the colloidal gold test was positive in 85 per cent., the Wassermann test in only 48 per cent., and globulin (Nonne) in 63 per cent. (twenty-seven cases).

In multiple sclerosis, the colloidal gold test was positive in 55 per cent., the Wassermann test in 0 per cent., the Nonne test in 28 per cent. (twenty cases). Here most of the cases fell in Zone 2.

In tumors of the brain and spinal cord, the colloidal gold test was positive in 55 per cent., the Wassermann test in 0 per cent., the Nonne and cell count were both low (fourteen cases). The curves occurred generally in Zone 3. The authors regard the findings as significant and probably diagnostic.

Miscellaneous cases showed twenty-one curves of 240 fluids examined. Twelve of the cases were in central nervous system involvement of some kind. Eight were in syphilitic patients, three of whom showed central nervous system involvement. From these figures the authors conclude that the absence of a curve definitely rules out central nervous system involvement of any nature.

In a small series of treated cases the colloidal gold reaction was found to have no value either in diagnosis or prognosis. The curve may change or remain unaltered and does not parallel the clinical course. The curve may appear with or without other signs after provocative treatment.

HAINES, Philadelphia.

THE SPINAL FLUID IN PRIMARY AND SECONDARY SYPHILIS.

JOSEPH MCIVER, M.D., J. A. M. A. **73**:1765 (Dec. 6) 1919.

The author, in his study of ninety-one cases of primary and secondary syphilis at the Philadelphia General Hospital, endeavored to determine, so far as possible, what percentage of cases would show infection of the cerebrospinal fluid by the usual laboratory methods. The tests made on each specimen of spinal fluid were the Wassermann, protein determination and cell count, and in every case comparison of the blood Wassermann was made with the findings in the spinal fluid.

The lesions varied from early chancre to a fading secondary rash. A ++++ Wassermann reaction of the blood serum was obtained in every instance; this was one of the factors determining whether or not studies would be made of the spinal fluid.

Only two of the cases showed a slight excess of protein in the cerebrospinal fluid; one of these, curiously enough, was in the chancre stage; the other was of two years' duration. Very little treatment had been given in either case.

The cell count was made immediately on removal of the spinal fluid. In cases of primary syphilis, the average number of cells to the cubic millimeter was 9—the greatest number of cells to the cubic millimeter for any one specimen was 17. In the cases of secondary syphilis, the cell count varied from 10 to 90. If a cell count of 5 to the cubic millimeter is considered the average in normal spinal fluids, practically all these cases showed a slight abnormality.

In conclusion, the author states: 1. There is a slight increase of lymphocytes in the cerebrospinal fluid in the majority of cases of primary and secondary syphilis. 2. The increase in protein is not so frequent as the increase in lymphocytes. 3. In the present series a ++++ Wassermann reaction was not obtained on the spinal fluid in any case of primary and secondary syphilis. 4. It does not seem reasonable to conclude that we can determine by the examinations of the cerebrospinal fluid in cases of florid syphilis, in what cases symptoms of the central nervous system will develop.

ADSON, Rochester, Minn.

A NERVE SYNDROME OF THE RETRO-PAROTID REGION. M. F. BONNÉT-ROY, Bull. méd. Par. **33**:807, (Dec. 27) 1919.

The comparative rarity of the condition warrants attention to the writer's clinical report.

The case given is that of a woman who developed an acute left-sided tonsillar abscess; the purulent infection extended and led to a focus in the left parotid region requiring external incision and evacuation. Signs of the following nerve injuries were found shortly subsequent: paralysis of the left hypoglossal nerve, paralysis of the left recurrent laryngeal nerve, partial paresis of the left spinal accessory with weakness of the sterno-cleido-mastoid and trapezius, and lastly, left-sided paralysis of the soft palate. Thus, only the last three cranial nerves were affected.

The writer considers that the paralysis was peripheral in type in each instance, and that it was the result of local toxic injury to the nerves.

He offers the subsequent course in the case as additional evidence. There was steady improvement, and two months after the first examination only remnants of the above syndrome remained. The patient was not syphilitic.

DAVIS, New York.

THE SURGICAL TREATMENT OF GUMMATOUS OSTEITIS OF THE SKULL. A. W. ADSON, M.D., J. A. M. A. **74**:385 (Feb. 7) 1920.

The author states that gummatous osteitis occurs in late syphilis and involves the outer table of the skull alone, or the outer and inner tables plus the dura and the brain. The gumma may be an isolated one, but it is more likely to be associated with numerous lesions on the skull, these lesions varying in size from 0.5 to 4 cm.; the smaller ones present a fluctuating mass, while the larger ones are necrotic, suppurating ulcers of the bone and usually open spontaneously.

The author feels that in addition to specific treatment, local surgical treatment, consisting of the removal of the sequestrum, or dead bone, is necessary. He reports a case of brain abscess, on which he operated. Wound infection

developed, resulting in a retraction of the skin edges and exposure of the parietal bone over an area of about 9 cm. by 6 cm. Considerable difficulty was encountered in effecting granulation, when the child accidentally bumped its head, loosening the outer table of the exposed bone, which was lifted off. Granulation quickly followed.

The same principle has since been applied in four cases of gummatous osteitis, that is, elevating and freshening the skin margins and removing all the necrotic bone with a chisel or rongeur to a depth at which living bone was exposed. After the removal of the sequestrum, wet dressings saturated either in boric acid or saline should be applied, and if epidermization is slow, skin grafting may be resorted to.

In making a brief summary, the author advises the removal of all necrotic bone in gummatous ulcers of the skull and suggests that this treatment also be applied to areas of denuded bone in nonsyphilitic cases, since granulation will at all times be hastened by the removal of the outer table of the skull.

AUTHOR'S ABSTRACT.

DISSOCIATED AMYOTROPHIC PARALYSIS OF THE BRACHIAL PLEXUS (UPPER TYPE) FOLLOWING THE ADMINISTRATION OF ANTITETANIC SERUM. JEAN LHERMITTE, Gaz. d. hôp. **92**: No. 67 (Nov. 4) 1919.

Lhermitte, after recalling the several manifestations of "Serum Sickness," reports three cases of paralysis and atrophy of some of the shoulder and arm muscles (cervical 5, 6 and 7). The deltoid, serratus magnus, spinati, biceps, brachialis anticus and triceps were attacked. There was no change in sensation in any of the cases, with the exception of severe neuralgia.

The onset was four, five and eight days after the injection. However, Lhermitte does not believe the paralysis was anaphylactic as no previous injections had ever been given these patients. He emphasizes the frequency of the occurrence of neurologic disease resulting from the administration of antitetanic serum.

Lhermitte feels that he has described a new syndrome characterized by a peculiar type of muscular and musculosensory dissociation.

KRAUS, New York.

SHOCK. ROBERT DUPONT, Progrès méd. **34**:519 (Dec. 27) 1919.

The author says it is possible to classify several types of shock. The nervous type is a reflex paralysis of the bulbar centers, the second type follows hemorrhage, the third type—so-called toxic shock—includes both infectious toxic conditions and muscle trauma toxic conditions unrelated to infection. He considers it proved that injured noninfected muscle tissue loses its nitrogen to the blood and "the augmentation of nitrogen substance in the blood (nonprotein and residual) is in direct ratio to the toxic (shock) phenomena."

But is he keeping to a proper conception of shock? Is he not discussing toxemia? The difference should be emphasized. Even as regards his own grouping, he admits that the types cannot always be clinically separated. However, he insists that the muscle injury type (without infection) can occur alone.

His summary concerning treatment brings out nothing new.

DAVIS, New York.

ACUTE ASCENDING (LANDRY'S) PARALYSIS AFTER AN ANTI-TYPHOID VACCINATION. G. Guillain and J.-A. Barré, Ann. de méd. **6**:218 (Aug.) 1919.

These authors report the case of a soldier who, one day after vaccination against typhoid, fell ill with stiffness of the legs. This spread to the upper extremities. Five days later the palsy became flaccid and the next day involved the bulbar centers. Four days later, the patient died. Kernig's sign was negative. The spinal fluid was negative as to cells (15), increase of globulin, or the pressure of the anaerobes or aerobes.

In brief, this was a case of Landry's paralysis of ten days' duration ending in death. Gross changes in the nervous system were not found at necropsy. No microscopic examination was made.

Kraus, New York.

COMPARATIVE STUDY OF THE BORDET-WASSERMANN REACTION ON THE BLOOD AND URINE. M. Clement Simon, Bull. de l'Acad. de méd., Par. **33**:73 (Jan. 20) 1920.

The author having discovered, in accord with other investigators, that the urine of syphilitics sometimes contains substances capable of deviating complement, has carried out the Bordet-Wassermann reaction on both the blood and urine of a series of 201 patients.

Although in the primary stage, the positive reaction is obtained in the urine in only 16 per cent of the cases, it increases in occurrence in direct ratio to the duration of the infection. In the primary and secondary stages, discordance in the two tests has always been in favor of the blood (blood +, urine —). But in the tertiary stage, the discordance has sometimes been in favor of the urine (blood —, urine +). Likewise in latent syphilis, the discordance was in favor of the blood in twenty-four instances and in favor of the urine in ten. These findings seem to indicate that the urine and blood show serologic differences that closely resemble those existing between the blood and spinal fluid.

Because in nine cases out of 100 a positive test of the urine was obtained when the blood was negative, the author thinks it should be a therapeutic dictum that the treatment of any case should be pursued until there is a negative reaction of the urine. He considers this just as important as bringing about, if possible, negative spinal fluid and blood reactions.

Davis, New York.

THE LEG SIGN—NEW OBJECTIVE EVIDENCE OF PARALYSES OR PARESES DUE TO PYRAMIDAL TRACT DISTURBANCES. J.-A. Barré, Presse méd. **27**:793 (Dec. 24) 1919.

The Barré sign is elicited on the prone subject by flexing the legs to a right angle with the thighs, and then instructing him to retain them in that position. When a pyramidal tract lesion is present, the affected leg quickly drops, either steadily or jerkily. Rapidity and completeness of descent is considered indicative of the severity of the lesion; an incomplete reaction, where the extension stops at an obtuse angle, or is followed by flexion back to the right angle, is still weakly positive. When questionable, the subject is told to flex the legs as strongly as possible on the thighs; flexion should be better on the sound side, and a decisive fall should then occur on the suspected side

when the legs are again placed in the vertical position. Another characteristic of a positive reaction is the presence of conspicuous muscular contractions on the affected side, voluntarily opposing the tendency to fall.

Normal persons can hold the vertical position for a long time, and paralyses from other than pyramidal tract lesions are claimed to give a satisfactorily negative reaction, even in the presence of considerable atrophy. Evidence is presented to show that malingering is difficult, and that hysteria gives negative reactions. Five hundred neurologic cases in all were tested, and positive reactions found only in those with at least a slight pyramidal tract disturbance. Pure peripheral lesions gave only negative reactions.

Barré's experience leads him to attach particular importance to this new sign. He believes it to be more valuable than the Babinski or other signs now in common use—more delicate, and as significant when negative as when positive. The explanation of its mechanism offered is that the muscles flexing leg on thigh are the weakest of the lower extremity groups, and that these weak muscles are relaxed while the strong extensors are afforded their optimum position. Further investigation and statistics of this sign would appear well worth while.

HUDDLESON, New York.

JUVENILE PARESIS. E. L. HUNT, Am. J. Syph. **4**:104 (Jan.) 1920.

The author recognizes six types of paresis: the simple dementing, the simple depressed, the agitated, the taboparetic, the classic expansive type and juvenile paresis.

The first reported case of juvenile paresis was that of Clouston in 1877.

Characteristically there is normal development during the first few years of life, with a gradual onset of symptoms that vary widely and may simulate (mental) backwardness, imbecility or cerebral atrophy. There may be defective memory, excessive childishness, fabrication or dementia. Associated with the fabrication there may be the characteristic imaginative embellishments. Sometimes there are alternating periods of exhilaration and depression with fears and anxieties.

The physical symptomatology may comprise tremors, exaggerated reflexes, fixed and unequal pupils and epileptiform convulsions. As in the adult, the multiplicity of lesions affords a widely differing syndrome. Frequently there is rapid emaciation and exhaustion.

The onset is usually at the age of 10 or 12, showing that there is a definite period of incubation in the child as well as in the adult. The course is about four years and the prognosis necessarily fatal. The colloidal gold reaction is sometimes the only means of making the diagnosis.

The patient whose case is reported, developed headache at the age of 6 and one month later had convulsions affecting the left side with severe twitchings of the left arm and leg. The attacks occurred at monthly intervals. A year after the onset there was a convulsion affecting the right side and producing aphasia; before this the patient was irrational and garrulous. The pupils reacted sluggishly to light and accommodation, the knee jerks were increased, there was a slight papular eruption on the forearms and the back. The Wassermann reaction was positive.

The first injection of salvarsanized serum caused an improvement. One other injection was given without modifying the picture. The child died two months after the first injection. No necropsy was performed.

HAINES, Philadelphia.

HISTOPATHOLOGIC FINDINGS IN DEMENTIA PRAECOX. Eva Rawlings, Am. J. Insan. **76:** (Jan.) 1920.

The result of a painstaking microscopic study of the cortex in twelve selected cases of dementia praecox is given in text and plates. A uniform set of changes is described: disappearance of stainable substance in the cell bodies, atrophy with fragmentation of the neurofibrils in all body and prolongations, laying down of fat granules and gliosis, most marked in the frontal and central regions. Such studies should be repeated on control cases, though the work involved seems unending, and in all conclusions must be considered the possible changes produced by the more immediate causes of death.

Bond, Philadelphia.

CONVULSIVE CRISES OF PLEUROPNEUMONIC ORIGIN. A. Barbé and R. Glénard, Progrès méd. **35:**113 (Jan. 11) 1920.

Five cases, all in adults, are briefly cited in which convulsive seizures began following either pleuritis or pleuropneumonia. The authors consider that this was more than a coincidence, and believe that the convulsive features were occasioned in each instance by the chest pathology acting as a peripheral irritation. They compare the mechanism to that of the convulsive crises in infants due to helminthiasis. At most, they claim that a pleuropneumonic affection plays an occasional rôle in the etiology of convulsions.

Davis, New York.

Society Transactions

THE PHILADELPHIA PSYCHIATRIC SOCIETY

Regular Meeting, Nov. 14, 1919

CHARLES S. POTTS, M.D., *President*

A CASE OF TRAUMATIC HYSTERIA. Presented by DR. M. R. GABRIO.

J. H., a white boy, aged 12, was admitted to the Philadelphia General Hospital, June 20, 1918. He was transferred to the Camp for Imbeciles at Byberry City Farms shortly after his admission to the hospital, with the diagnosis of imbecility, complicated with convulsions.

The family medical and social history was not obtainable, as the patient had no close relatives or friends and was a charge of the city. The history during his stay in the hospital was: He possessed the intelligence of a rather high type imbecile; clean and tidy about his person; adaptable to his surroundings; and had epileptic convulsions at infrequent intervals, from which he suffered no inconveniences other than at the time of the attacks.

On July 20, 1919, during a severe electric storm, the patient was found lying on the bathroom floor in a semiconscious condition. He claimed to have been struck by lightning while getting a drink of water, and to have been knocked to the floor. He stated that the lightning struck him on the left side of his face, his left arm, forehead and hand. Dr. Gabrio saw the patient within fifteen minutes from the time of the accident. He was in a highly nervous state and complained of pain along his arm and hand. His arm and forearm exhibited a spastic condition which was more marked in the forearm; the fingers and thumb were drawn tightly into the palm of the hand, while the distal phalanx of the thumb was in the position of extension. There was slight impairment of sensation. There were no other physical signs. The pupils were slightly dilated but reacted to light and accommodation. There were no evidences of gross cerebral lesions or any evidence of external injuries, such as burns or bruises. Examination was rather difficult as the patient complained of pain as soon as the parts were touched. Rest in bed with sedatives and massage was ordered.

On July 21 he was again seen. The pain had subsided and the spasticity and marked flexion of the fingers could be partially overcome when his attention was diverted. At this time the psychic and nervous symptoms were not so pronounced, as he was more calm and cooperative. There was still slight impairment of sensation along the arm, forearm and hand. Massage and mental diversion were prescribed, and the patient made a complete recovery in about ten days.

The case was regarded as one of traumatic hysteria resulting from psychic fear or actual shock of the flash of lightning. There is considerable doubt as to the patient having been actually struck by the lightning. The condition was similar to those psychic and physical manifestations seen in shell-shock and certain morbid neuroses.

A PSYCHOSIS IN A MAN WITH SYPHILITIC INFECTION: PROBLEMS.

Presented by Dr. Daniel H. Fuller.

The patient was a man, aged 32, a native of Philadelphia, and born of American parents. His father, paternal grandfather and one paternal uncle were heavy drinkers. His father died of cirrhosis of the liver at 44, and one maternal uncle died of pulmonary tuberculosis at 21.

The mother was an energetic, active and capable woman, emotionally unstable but devoted to her children and especially to this only son, whose career she had apparently attempted to dominate in her ambitions to have him succeed. She was argumentative, persistent and determined, inclined to misquote statements and to put words into the mouths of her advisors to color her own views. Her methods might justify, to some degree, her son's complaint that she nagged him and interfered with his affairs, although she was sincere and earnest in her procedures, for he was her pride and his failures were a great blow to her ambitions and a stimulus to her determined effort to help him in her own way and in spite of his opposition. These characteristics of the mother are enlarged on to show a little of the environment to which the patient had to react.

The patient was the second of four children. He started school at the age of 5, entered the high school at 13, the University of Pennsylvania at 17, and was graduated as an engineer at 21, in 1908. The Reading Railroad Company was then elevating their tracks and he was put on that work. He held that position for over a year, then became restless, felt there was no future in the city's employ and too much graft; so he left and took a position with the Pennsylvania Railroad. At the end of three months he was offered a position with the government as inspector of material for the locks in the Panama Canal, at $125 a month; he accepted it and went to Panama in February, 1910, remaining there until September, 1913. He did well and was earning $225 a month when he came back and invested in bonds the $3,000 which he had saved.

On his return from Panama he joined his mother, who had broken up her home and was traveling, and he stayed wherever she happened to be. He complained of being very tired and decided to rest for a time before taking another position. His mother thought this was doubtless the effect of the climate in Panama, and felt it was wise for him to rest; months went on, however, and patient showed no inclination to work; though he was normally restless in disposition, ambitious and anxious to be busy, he was now content to sit around hotels. He was not extravagant in his tastes, did not drink at all but smoked to excess. After his money had been spent, his mother allowed him $12 a week and bought his clothes for him. This seemed to satisfy him; he never complained and never tried to get a position, but seemed a little depressed.

In February, 1916, the patient returned to Philadelphia and took a room in a lodging house on Arch Street, where he met a Danish girl, a divorcée, quite uneducated, who worked in the kitchen of a large department store. He married her on short acquaintance. He had no position at the time but shortly after obtained one with the Pennsylvania Railroad at $80 a month. Although his mother was not pleased with the marriage, she was delighted that he had gone to work, tried to put her disappointment aside and to think that it might be an excellent thing for him. To encourage them, she furnished a house for them. Previous to this, however, and soon after the patient's marriage, the mother offered to help him secure a divorce if he desired at any time to obtain one. The wife gained knowledge of this offer and was naturally much incensed.

In August, 1917, he took a position as government inspector with the Ordinance Department in West Virginia, at $200 a month, where he remained until May, 1918, when he became restless and dissatisfied and miffed over an argument with his superior officer concerning pay for overtime. He was transferred to the Navy Yard in Philadelphia, where he remained three months, until August, 1918. In that position he was reported to have been dilatory and unsatisfactory in his work, and was discharged for inefficiency. He almost immediately secured a position with the Emergency Fleet Corporation at a smaller salary, and remained there until November, 1918, when his present breakdown occurred. His work there was below the grade a man with his education and training should have been doing; he was slow and worked long hours; he was very quiet and had little to say, "was thought to be a 'queer duck' and they let him alone"—no one felt that he knew him at all well.

He had frequently received substantial aid from his mother since his marriage; sometimes it was entirely unsolicited, although very welcome, and many times it was in answer to his appeals.

He is said to have been unusually bright in school and his mother described him as gentle, affectionate, thoughtful and considerate of her, companionable and confiding. A friend of his student days described him as "very quiet, studious and clean-spoken." He had never used alcoholic liquor but had smoked to great excess. He admitted he was told that he had had syphilis some fifteen years ago.

His married life, he said, was happy and without unusual friction until the present trouble, when he claimed his mother interfered and broke up his home. His wife stated that he was always at home, that they had had no quarrels before the present illness, and that he was always reading and studying. They had one child, nearly 2 years old.

The general breakdown dated from November, 1918, when he experienced some kind of a collapse when alone in the office. He described it to his mother as "losing hold," a "sort of fear," and said that he prayed to God to take care of him. His wife came and took him home. She reported that he was found crying with his head on his desk; he thought some "psychologists" were trying to get him to do or say certain things and were working on his mind. He seemed to have recovered in a few days, but did not return to work. His mother was summoned and immediately took him to a nerve specialist, who made a thorough study of the case, obtained a positive Wassermann reaction of his blood and gave a guarded prognosis, advising arsphenamin treatments. The patient consulted several physicians and was finally persuaded to go to a private sanatorium for treatment, his mother agreeing to pay his expenses and also to support the family while he was being treated. He stayed only a week and left in impatience and resentment because his mother had not paid anything to his wife and because he had not received a treatment. Much pressure was brought to bear on him to persuade him to receive treatments, and he finally submitted to four injections of arsphenamin and he absolutely refused more. He was obstinate in his refusal and became bitter, suspicious, resentful and threatening toward his mother and the physicians who urgently advised intensive antisyphilitic treatment. He was sullen, unreasonable, argumentative, and quarreled with his wife, accused his mother of trying to separate them, accused the mother and doctors of a conspiracy to poison him with treatments and to compel him by fair means or foul to take them. He refused to work, demanded $1,500 of his mother as due him for failure to keep her promise, and talked in a most bitter and vindictive manner.

In the hope of compelling him to receive treatments, his mother finally withdrew her financial aid until his wife was forced to store and sell her household goods and go to work to support herself and the child. To learn more definitely of his home life and conduct, the mother's lawyer employed neighbors to observe and report on their goings and comings. This was known to the patient later on. He was finally so suspicious and so convinced of a plot against him, that he personally threatened with violence the consultant physician and also threatened to bring suit against him and his mother and others. At this point his mother was persuaded to have him committed, with the expectation that when committed treatments would be forced and cure would follow. He was committed to the Pennsylvania Hospital May, 1919. Here physical examination showed a body of masculine type, the face symmetrical, the forehead high, the distance between the eyes wide, the features clear-cut and of rather delicate mold. The palatal arch was rather high, the tonsils not unusual, and the teeth in fair condition but needing attention. The heart was negative except for a faint short murmur at the apex, replacing the second sound. The genitals were normal, except for the absence of the frenum which he said was burned off with acid seven years ago. The pupils were unequal, the right being permanently larger than the left; they were regular in outline and concentric with the iris, and reacted promptly to light and accommodation. All of the deep and superficial reflexes were very active. There were no pathologic reflexes and no ankle clonus. Coordination tests were well performed and test phrases were satisfactorily done. There was marked tremor of the closed eyelids, and fine fibrillary tremor of the protruded tongue. The urine showed a faint trace of albumen; the blood Wassermann test was positive; the spinal fluid Wassermann test was negative; the cell count was 1 per c.mm. Protein examination showed the Nonne test to be slightly plus, the Ross-Jones doubtful, and the Noguchi negative. The colloidal gold test read 1111000000.

Mentally, the picture did not change since his admission to the hospital. Consciousness was clear. He showed no special defect of memory and retained his school knowledge. He had a fair knowledge of current events and was clearly oriented for time, place and persons. Emotionally, he was neither depressed nor elated. Affectivity appeared to be diminished, and while he said that he was worried, his feeling appeared to be resentment over his alleged wrongs rather than worry, anxiety or grief over his present situation or his future. He expressed no concern over the support and comfort of his wife and family, and there was marked indifference over matters that would naturally perturb one; nevertheless, he appeared pleased when his little 2-year-old child visited him and was attentive to her at these times. Any questions as to explanation of his past conduct in not working brought out resentful objection to the questions or sarcastic flings at others in his attempts to justify his course. Several times, entirely spontaneously, he told events in the family life which threw suspicion and inuendo on his mother's character and aired unnecessarily certain aspects of the family life in an unfeeling or malicious manner. He at first associated quite freely with others, staying about with them and playing games, but later secluded himself, staying in his room except at meal times, occasionally going to a theater or moving picture show.

There were no hallucinations. His delusions were a mixture of suspicious inferences and willful misinterpretations, which crystallized into the belief that doctors were against him, that doctors ruled the community, that they had deliberately poisoned him and that they could be hired to do any mean job under the cloak of their profession. All his thoughts seemed to be tinctured

with a sense of injury and injustice and an irrational determination not to yield in his opinions or to admit reason in those of others. He was quick tempered and on the slightest provocation reacted out of all proportion to the cause in a tirade of abusive talk, vituperative and sarcastic utterances, unwarranted accusations and extravagant statements. He not only lacked insight into his condition and situation, but was unable to discuss it with sense or any approach to fairness. His talk was coherrent and his associative processes clearly established, but his reasoning was weak and foolish and inconsistent. He was reasonably careful of his personal appearance, cleanly in his personal habits and not inclined to obscenity or vulgarity in conversation.

To sum up, a man of 32, with a college education and a record for unusual brightness in his studies, of a quiet, studious and gentle nature, was graduated at the University of Pennsylvania as an engineer at 21. After filling two or three minor positions, he went to Panama and worked hard and successfully as inspector of material for locks on the Canal for over three years. On his return he was disinclined to work after a reasonable rest, and for nearly two and a half years he remained idle, used up his savings and depended on his mother for support. He was lacking in interest and ambition or sense of obligation. At the end of this period, after much pressure to get him to work on the part of his mother who was ambitious for and perhaps oversolicitous and overzealous in her methods, he married a woman of inferior education and social status, although of good character. The marriage was an unconcealed disappointment to his mother. He immediately found employment and continued to work for about two and a half years, but with decreasing efficiency, changing his situation three times and finally breaking down entirely at the age of 32, when it was found that he had a positive Wassermann reaction of the blood. After that he did no work, even though his unproductiveness necessitated the breaking up of his home and the driving of his wife to supporting herself and her baby. He submitted to four intravenous treatments under great protest, but otherwise obstinately refused treatment of any kind.

He was committed to the Pennsylvania Hospital in May, 1919, and while he showed marked physical improvement and acknowledged feeling rested, he was unreasonable, deluded about his condition and the situation, suspicious, abusive and threatening in his talk and obstinately unyielding in his attitude and opinion. There were no hallucinations, no marked memory defects, no euphoria or depression, but a marked emotional apathy in regard to his family obligations. Physical signs were generally lacking except for inequality of the pupils and some fine fibrillary tremor of the protruded tongue. Attempts at diagnosis left him in the unclassified list. Paresis and dementia praecox seemed the most probable considerations.

In view of the gradual development with personality changes and failing efficiency covering a period of six years, culminating in a complete breakdown while at work of lower grade than his qualifications fitted him for, his inability or unwillingness to get employment afterward, his suspiciousness, delusions of persecution, unreasonableness, indifference about his family obligations, great irritability, lack of insight, exaggeration of his own opinions and intolerance of others, one was inclined to diagnose his case as one of dementia praecox of a paranoid type in a man having a syphilitic infection. If he were a paretic, a more pronounced deterioration of both his intellectual and affective faculties would have been expected in connection with the marked changes in personality which so gradually developed and which showed no improvement in spite of greatly improved physical condition. There was not the gross deterioration that

usually develops in a much shorter time after the appearance of the first marked symptoms of mental change in the paretic, nor had the physical signs of degeneration appeared.

Problems.—This patient was sent to the hospital by his mother for antisyphilitic treatment with the idea firmly fixed in her mind that arsphenamin injections would positively cure him, and that without these he was doomed to rapid deterioration and hopeless insanity. The patient refused to take treatments; he violently protested whenever they were mentioned, declaring that the hospital had no legal right to force drugs into him, and that he would resist and smash all of the apparatus in sight. He believed that his father was poisoned by mercury prescribed by doctors, and said that he himself was made very ill by the four treatments received the previous winter; he refused also on the ground that he would not take treatments under compulsion of agents paid by his mother, but thought he might consent to take them outside, some time in the future, say a year hence, if he could employ his own doctor and pay him himself. He not only refused intravenous injections but medicine of any kind. He even refused to have his teeth examined and treated, saying he would wait until he was released and then employ his own dentist.

The hospital took the position that it was unwilling to force treatments on a patient who so strenuously and persistently protested while his consciousness was unclouded. There was an uncertainty as to whether the psychosis was dependent on his syphilitic infection, and as no guarantee of cure could be given even if an intensive antisyphilitic treatment was administered, physicians in attendance felt still less inclined to attempt to force him to take such treatment. His mother was equally persistent and determined that he should have treatment, and was critical of the position taken by the hospital. She felt that it was his right and that to protect his best interests and assure him of a future, the treatments should be given in spite of his protests, even if it were necessary to etherize him to do it. Her accusations of lack of cooperation, of failure to give the patient proper treatment, coupled with her earnest beseechings, made the problem more complicated. From the legal standpoint, the hospital was undoubtedly taking a proper stand. With threats for habeas corpus and suits for damages in the patient's mind, there were further reasons for conservatism in the management of the situation, although we believed that intravenous treatment was indicated and would have given it if we had not been opposed.

Was the psychosis dependent on syphilis? Whether it was or not, was it the duty of the physician to compel intensive antisyphilitic treatment against the positive and violent protest of the patient?

CHICAGO NEUROLOGICAL SOCIETY

Rgular Meeting, Nov. 20, 1919

LEWIS J. POLLOCK, M.D., *President*

TUMORS OF SPINAL COLUMN CAUSING NEUROLOGIC SYMPTOMS. Presented by DR. D. B. PHEMISTER.

Almost every type of new growth occurring in bone may develop in the spine, but their relative frequency differs greatly from that in the long bones. Of the benign tumors the most common is cartilaginous exostosis, which may occur alone but usually is part of multiple cartilaginous exostoses. The tumor may arise from the posterior part of the body or arch of the vertebra

and project outward, making root symptoms as in Figure 1, or it may project into the spinal canal where it makes compression symptoms of the cord or of cord and roots. It usually consists of an oval outgrowth of spongy bone with an irregular cortex and of about the same density as the vertebrae. The surface is capped irregularly by islands of cartilage which have the atypical structure of epiphyseal lines and through which growth of the exostosis occurs. Growth usually is most marked during the second decade and ceases about the age of 20 with the closure of the epiphyseal lines throughout the skeleton. Hence, symptoms usually begin during the second decade, although they may come on much later. Pain, except that arising from pressure, is not a feature of the disease and operative removal, if all of the cartilaginous covering is obtained, is not followed by recurrence.

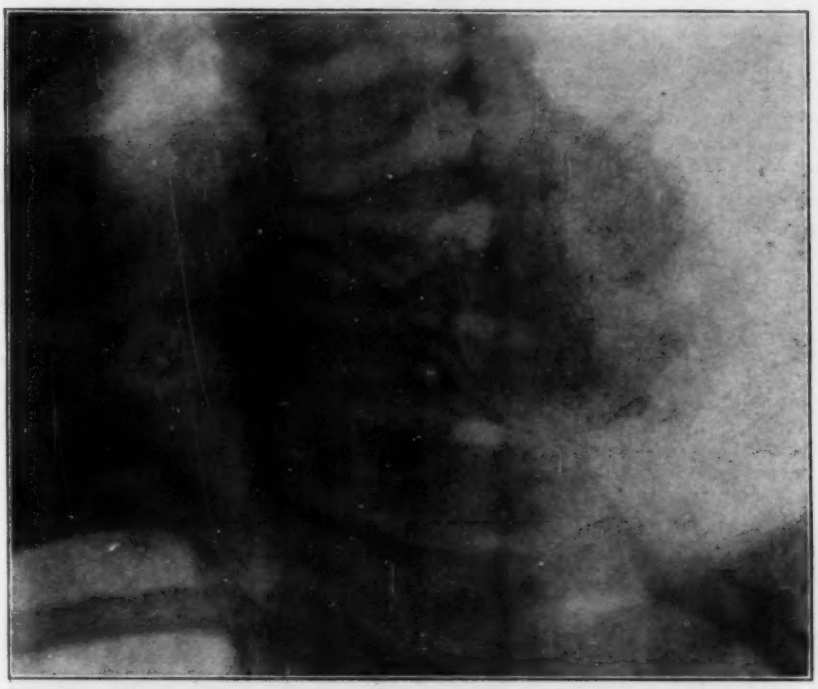


Fig. 1.—Exostosis of cervical region producing root symptoms.

Fibromas are sometimes seen, with root and cord symptoms, encroaching on the spinal canal and eroding the bodies or arches of the vertebrae. In such cases it may be difficult to say whether the tumor arose primarily from the bone or from the extradural structures of the spinal canal, but the occasional extensive erosion would seem to point to the bony origin. Bassoe reported such a case before this Society in 1915. The patient was successfully operated on by Dr. D. D. Lewis, first by a decompression operation in 1914 and subsequently by removal of the tumor in 1917. The patient has remained well to date.

Bone cysts, which are frequent in the long bones, have not been reported in connection with the spine.

Sarcomas show these variations from those of the other bones:

1. Marked ossifying forms are not so apt to occur.
2. Medullary giant celled tumors do not occur.
3. Hemangiomas and hemangiosarcomas are relatively common. About two thirds of such tumors affecting the bones have been located in the spine.
4. Mixed cell tumors are relatively frequent.

Their composition is variable, including myxofibrochondromatous and osteosarcomatous elements. Recently I have seen a more malignant form of the slightly calcified and ossified type of chondrosarcoma of the body of the fifth

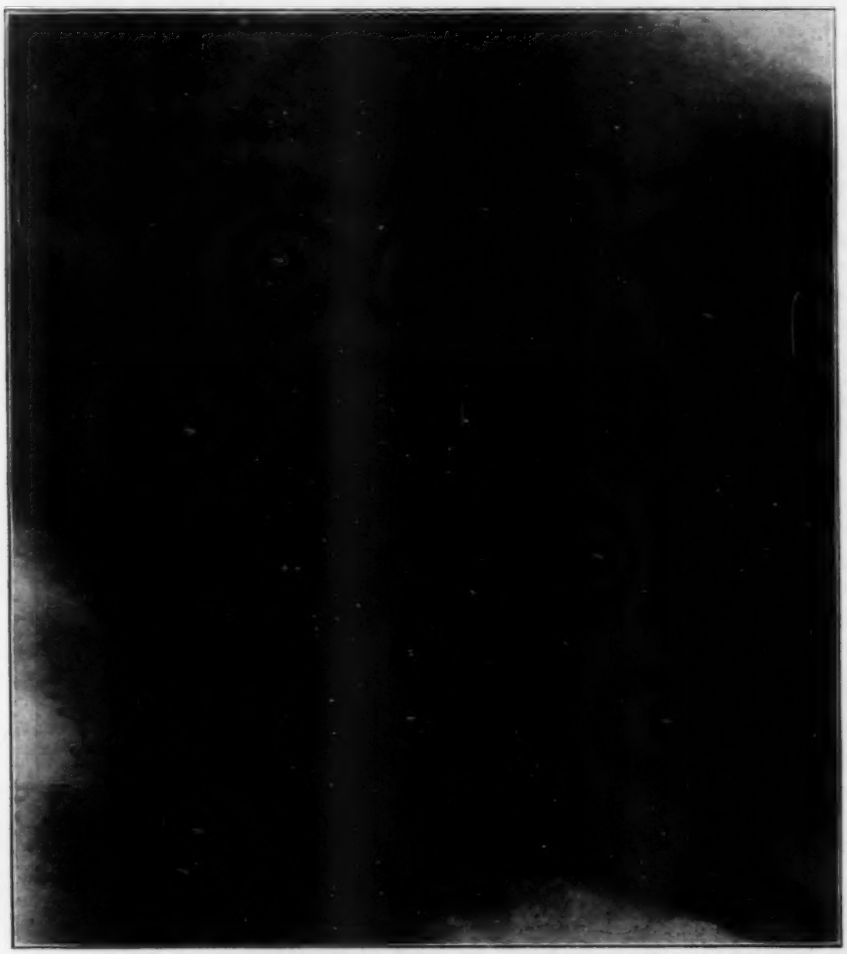


Fig. 2.—Mixed cell sarcoma from periphery of third thoracic vertebra making root symptoms.

cervical vertebra, making root symptoms of one and one-half years' and cord symptoms of six months' standing. The destruction of the body, with isolated shadows scattered irregularly throughout the tumor, as shown by the roentgen ray, made the diagnosis very probable before confirmation by operation and pathologic examination of the tissue.

Figure 2 shows a more benign form of this type arising from the side of the third thoracic vertebra in a woman, aged 36 years, who had suffered from left intercostal neuralgia for five years and from pain in the tumor region during the last two years. It was partly removed and treated by radium by Dr. D. D. Lewis. Histologically, it was a fibrosarcoma with extensive degeneration and isolated areas of cartilage and bone.

The commonest form is the round or spindle celled sarcoma which gradually destroys the bone and shows no tendency to ossify. Spine, root and cord symptoms are all liable to occur. Unless early death results from injury of the cord, the process is apt to extend through the periphery of the bone and make a tumor of considerable dimensions which facilitates the diagnosis.

A round celled sarcoma of the third cervical vertebra in a man, aged 38 years, had eroded the bone and led to marked pain with rapidly developing cord symptoms ending in complete paralysis below the level within two months of the onset. Pathologic fracture or dislocation may occur.

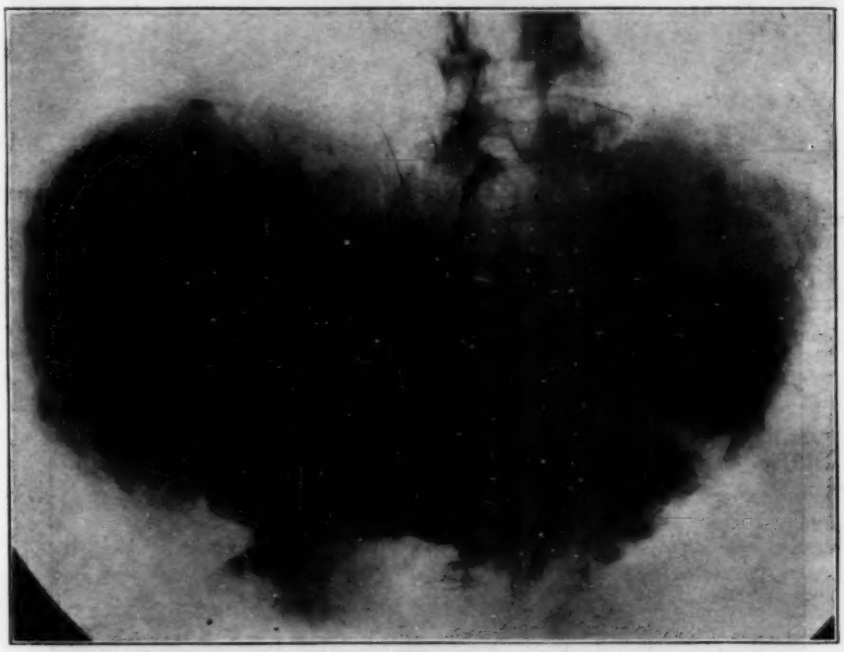


Fig. 3.—Spindle cell sarcoma of sacrum producing root symptoms. All of heavy shadow is tumor mass.

Figure 3 is a roentgenogram of a necropsy specimen of spindle celled sarcoma of the sacrum in a woman aged 28 years. It was of five years' standing and reached enormous proportions before death. There was no ossification in the tumor. The sacro-iliac joint was markedly displaced outward, and the fifth lumbar vertebra partly eroded. Intervertebral disks were not destroyed. There were marked local spinal symptoms throughout and a varying double sciatica during the first three years, after which motor symptoms developed in the limbs with disturbances of the bladder and rectal control, along with

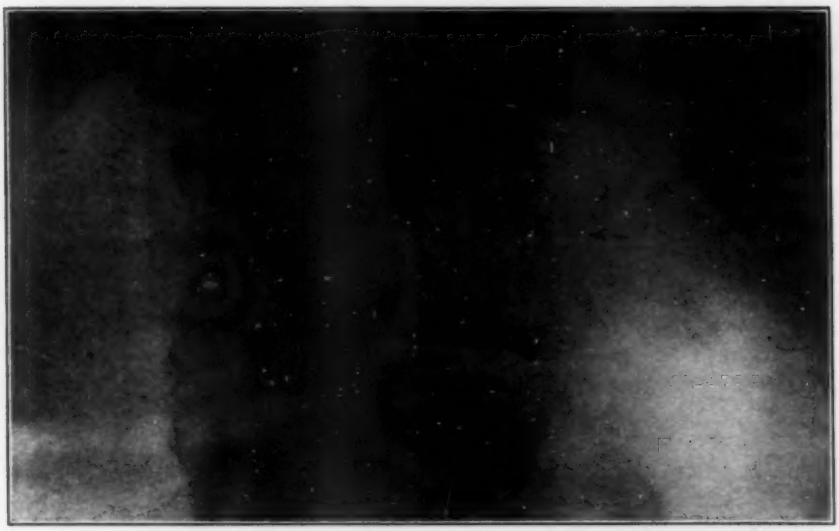


Fig. 4.—Osteoclastic carcinoma metastasis from thyroid spine symptoms without collapse of body of first dorsal vertebra.

Fig. 5.—Metastatic osteoclastic carcinoma from breast collapsing second lumbar vertebra.

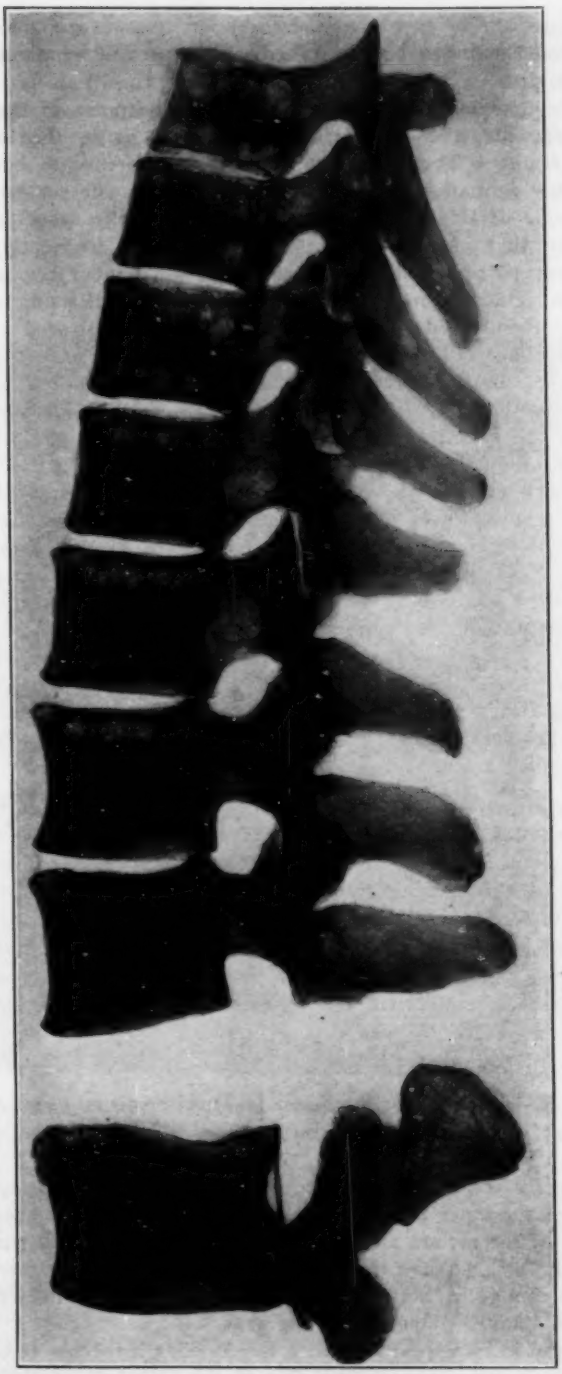


Fig. 6.—Roentgenogram of one half of bodies of thoracic vertebrae removed in case of carcinoma of prostate, showing osteoplastic metastases; below, normal vertebra for comparison.

a palpable tumor. The case was studied by Dr. Bassoe, and a lumbar exploratory operation performed two years after the onset of symptoms, with negative findings.

Metastatic carcinoma is by far the commonest tumor of the spine and is especially frequent when the primary carcinoma is in the breast, thyroid, kidney or prostate. There are two types with reference to bone destruction and new bone formation—the osteoclastic and the osteoplastic. The osteoclastic, or bone destroying form, is common, especially from primary tumors of the breast, thyroid and kidney. The lesions are frequently multiple and may be in any portion of the spine, although the lumbar region is relatively more often affected. Spine symptoms, especially a dull pain, frequently preceded the root and cord symptoms as in the case illustrated in Figure 4 of metastases in the first lumbar vertebra from carcinoma of the thyroid. Extensive metastases destroy the bodies of the vertebrae, leading to collapse, as shown in Figure 5, from carcinoma of the breast. The tumor frequently breaks through into the spinal canal, causing marked root and cord symptoms, and frequently to the outside with the formation of a mass about the bodies. Occasionally a small amount of ossification will occur in its substance.

Osteoplastic metastases are rarer and much less understood. They arise especially from carcinoma of the prostate (Figure 6), but occasionally from primary tumor of other organs, such as the breast. The metastases are usually small and diffuse, leading to marked new bone formation, filling out most of the cancellous spaces and giving the bodies and arches a dense structure which casts a heavy shadow in the roentgenogram. Breaking through the cortex rarely occurs, hence cord and root symptoms and shadows on the outside of the bodies are rarely present. Marked spine symptoms are common, consisting of shifting rheumatic pains similar to those produced by like metastases in the bones of the extremities.

Dr. Phemister, in closing, said that myelomas of the spine nearly always cause breaking down of the body, and symptoms corresponding to carcinoma.

Concerning the roentgen-ray treatment of cases of the destructive type, Dr. Pfahler of the University of Pennsylvania, showed at the American Roentgen-Ray Society a series of roentgenograms before and after roentgen-ray treatment, and it was astonishing to see how he could bring about an ossification in a nonossified spine, and convert it into a spine much like the one he had passed around. He also relieved the symptoms so that the patients lived for seven years. It was a most striking palliative therapeutic result from the use of radiotherapy.

Dr. Carl B. Davis: As an adjunct to Dr. Phemister's paper, Dr. Bassoe suggested that we report an interesting case which we have seen together recently.

The patient, a young woman, aged 28, reported to Dr. Bassoe with a history of pain on the inner aspect of the right arm and running around the chest in the region of the second and third intercostal spaces. The pain was worse when using the arm. When the shoulder girdle was at rest there was relief. There was no change in tactile, pain or heat sensations and no atrophy. There seemed to be diminished power in the arm.

Roentgen-ray examination showed a tumor mass involving the second, third and fourth ribs on the right side. The shadow extended out along the ribs for a distance of approximately 3 inches. The plates also showed osteophytes in the region of the wrist and knee joint. The osteophytes extended down-

ward along the tibia and upward on the femur from the region of the lower epiphysis. Physical examination showed that she was normal otherwise.

Under general anesthesia the muscles attached to the right upper six dorsal spinous processes were freed and turned outward. The erector spinae muscle was pulled medianward. The tumor, including 2 inches of the second, third and fourth ribs, was resected. It had been hoped that a retropleural resection would be possible. At operation, however, it was found that the pleura was tightly adherent over the anterior surface of the tumor so that it was necessary to make a defect in the upper chest wall approximately 4 inches long and 3 inches wide. After removal of the tumor the right lung was seen in col-

Fig. 1.—Tumor mass involving the second, third and fourth ribs.

lapse. There was no shock and no pulse change other than a slight increase in rate. The muscles were stitched closely over the pleural opening in such a manner as to produce an air-tight cavity. The wound was closed without drainage.

The patient experienced an average convalescence until the fifth day. During these five days there was a slight elevation of temperature, a moderate increase in pulse rate and increase in the leukocyte count. On the morning of the fifth day while sitting up to eat her breakfast, she gave a gasp, and with all the symptoms of a pulmonary embolism died within a few minutes. Necropsy was refused.

The tumor proved to be a mass of bone and cartilage, probably an overgrowth analogous to the osteophytes that were found in the region of the epiphyseal line, due to abnormal development and closure in the epiphyseal lines.

The case was especially interesting because of the resemblance of the symptomatology to that of a cervical rib.

The second case is that of a patient who complained of pain in the neck and arm, made worse by carrying any weight in the hand on the affected side. Weakness and atrophy of the muscles in the ulnar region were present. The patient presented symptoms that might be present with a cervical rib. Roentgen-ray examination showed an osteoma arising from several of the lower cervical vertebrae. The tumor mass extended out into the neck in such a

Fig. 2.—Osteoma in the cervical region.

manner as to involve the roots of the brachial plexus. The mass was removed and the patient obtained relief for approximately two years. Recently there has been a return of symptoms and roentgen-ray plates show a recurrence of the tumor, larger than before. The cervical roots are involved in such a manner that there is now ulnar paralysis and atrophy with sensory changes in the ulnar distribution.

DISCUSSION

Dr. Peter Bassoe said that one case of particular interest to him was that of a woman, aged 28, who complained of pain in the lumbar and sacral regions, and who was first seen in the summer of 1917. There was pain in the legs, more pronounced in the left; she had not walked alone for over two months.

He made a diagnosis of a lesion of the cauda equina. There were diminished pain and temperature sense in both legs, corresponding to the lower lumbar and upper sacral segments, atrophy of the leg muscles and absence of ankle reflexes. The Wassermann reaction was negative for both blood and spinal fluid; there was no increase in the cells. There were a strongly positive Nonne reaction, and a positive Lange test of a compression type. At that time nothing was found to be wrong with the bones on external or roentgen-ray examination. Dr. Dean D. Lewis performed a laminectomy, but found nothing except some small spots in the meninges. The patient went home, and a year later developed palpable and visible lumps about the pelvis. These had appeared six months after the operation. The lumps were large, firm, subcutaneous; the largest was 6 inches in diameter. The patient died about three months later, and the whole pelvis was removed at necropsy. There was a large, comparatively soft tumor all around the pelvis, filling the sacral fossa; there were also large tumors projecting backward, and further study revealed the fact that it involved the bone of the sacrum, and that it was a sarcoma. The interesting point was that the patient had had a sarcoma there all the time, and it had not produced any bone deformity, and it was two years after the cauda equina symptoms appeared that the presence of the tumor was recognized.

Other cases were less obscure. One woman, seen first in January, 1917, had pain in the hip, then in the buttocks and left leg; later in the right leg, more severe than in the left. Roentgenographic examination disclosed a bone defect in the iliac crest. Necropsy revealed a sarcoma.

The speaker had also looked up cases of carcinoma that he had seen (one person's experience did not amount to anything), but he had found eleven cases of primary carcinoma of the breast with metastases in the vertebrae, and three or four of primary tumor of the prostate, and two or three of uncertain origin. Some features about the breast cases were rather interesting. Two of these patients had been treated as neurasthenics. In one woman he found a very tender spine and a lump in the breast which no one had noticed before. He had the same experience with another patient. Women often concealed the presence of a breast tumor, but it was rather strange to have it happen when severe symptoms of metastatic growth had been presented for some time. In two of the cases abscess of the breast had preceded carcinoma. One patient had returned to the hospital where she had been treated for the breast tumor, but it was not noticed that there was a lump at the bottom of the scar of the abscess. Roentgenographic examination revealed extensive decalcification of the spine in several places. In one case, there had been an abscess in 1902, a tumor appeared in 1903, and the breast had been amputated in 1910, seven years after the tumor was first felt. The same year, pain began in the back and later in the legs, and the patient succumbed one and one-half years after the onset of the spinal tumor. In that case also there were metastases in the skull. In one case, the breast was removed and the patient complained of severe pain at the time of operation; the tumor was discovered only a few months before. In that case the only metastatic tumor in the body was in the vertebrae.

In one case of carcinoma of the breast, the tumor was found in 1910, removed in 1913, and there were no symptoms until 1916, when pain in the back and unsteadiness in the gait occurred. It was said by those who performed the necropsy that no lesion in the spine was found. The roentgen-

ray disclosed nothing, but there were growths in the cord itself along the meninges. The posterior part of the cord was most affected, which was in accord with the cases reported by Dr. Phemister.

The earliest symptom in all the cases was severe pain in the back, with exquisite tenderness. In one case this was localized along the fifth rib. Backache and tenderness seemed to be the most prominent early symptoms, while symptoms of the motor roots had not been observed.

He had seen one rather peculiar case of bilateral sciatica in which the patient had had a tumor of the nose eleven years before, which had been removed. Dr. Hyde had said it was benign and there was no further danger, but nine years later there was a local recurrence, which was treated with roentgen rays; two years later the patient developed severe sciatica, first on one side and then on the other. When he first saw the patient he thought there was no tumor, but necropsy revealed a carcinoma of the vertebra. The interesting point was the unusually long latency, and the slowness in the development of the definite signs of the existence of tumor.

Dr. George B. Hassin asked what Dr. Phemister's experience had been with myelomas.

A CASE OF OCCLUSION OF THE RIGHT POSTERIOR INFERIOR CEREBELLAR ARTERY. Presented by Dr. George W. Hall.

A man, about 35 years of age, while on his way to work, suddenly became dizzy and fell to the ground, but did not lose consciousness. Examination at that time showed horizontal nystagmus and ataxia of the right hand and leg. He was hoarse for four or five days, and the pulse was slow for several days. One week later while walking on the sidewalk he had a tendency to fall to the right. He partially recovered, but had a recurrence of symptoms about one month later. At that time Dr. Hall examined him. His head was tilted toward the right, both pupils reacted to light and accommodation. The right pupil was smaller, the palpebral fissure was narrower on the right and exophthalmus was present. Optic disks were normal; hearing was normal. Facial muscles on the right side were paretic, and there was slight atrophy of the right side of the tongue. Hemi-anesthesia of the right side of the face and loss of pain and temperature sense over left side of the body were present. Tactile and position sense everywhere were normal. Dr. Hall thought that in many instances it was impossible to differentiate clinically between occlusion of the inferior cerebellar artery and the vertebral.

CHICAGO NEUROLOGICAL SOCIETY

Meeting of Dec. 18, 1919

Lewis J. Pollock, M.D., *President*

TUMOR OF SELLA TURCICA WITH PRESENTATION OF SPECIMEN. Presented by Dr. Ralph C. Hamill.

The patient was a man, aged 25 years, who died Oct. 20, 1919. He entered Wesley Hospital, Aug. 30, 1919, complaining of severe headache from which he suffered for seven weeks in 1914. At that time the examining physician said the headaches were due to heart disease. The attack that brought him

into the hospital had lasted twelve weeks, during which time he had had very severe right-sided headaches at short intervals. The pain would last for from two to ten minutes and reappear every half hour. The attacks were precipitated by change of posture, especially sitting up, and were accompanied by vomiting and dizziness. He also complained of attacks of breathlessness and palpitation on exertion. Twelve weeks before entering the hospital, he had an epileptiform seizure and subsequently had four others, two of which were observed in the hospital. They all occurred on changing position, principally on sitting up, and lasted for two or three minutes, during which time he became more or less rigid; the pupils were dilated, the pulse about 50, and respiration stertorous. Inquiry failed to reveal any aura.

The past history revealed nothing of interest, except that at the age of 13 he fell on the ice, striking the right temporal region. He did not become unconscious and walked home, but said that his right eye had turned in ever since. Paralysis of the abducens nerve was noticed on entrance to the hospital. The family and personal history were negative, aside from the above.

Examination showed that the heart was enlarged, with a loud, systolic blow at the apex, a diastolic blow over the base and no accentuation of the pulmonic second. There were skipped beats which were very irregular in phase —might skip every third or tenth beat. Heart block was suspected.

Neurological Examination.—There was internal rotation of the right eye which could not be turned outward beyond the midline. The pupillary reflexes were normal and vision of the right eye greatly reduced but he could read with the left. There was no hemianopsia. Both disks were choked, the right one grayish-white, the outline was blurred and the vessels atrophic. Outlines of the left disk were blurred and there were some small hemorrhages near the disk. Hearing was normal. The ears being douched with cold water (two examinations) showed that the left reacted well, with nystagmus, dizziness and past pointing. The right reacted only at the expiration of fifty seconds. Sense of smell was normal. The gait showed nothing. The face had rather a blank look, but facial movements were normal. The tongue was in the midline. At times there was tactile anesthesia of the right cornea, which gradually increased during his stay in the hospital.

Strength of hands and arms seemed normal; he could supinate and pronate the hands equally on both sides, the right slightly slower than the left. The finger to nose and finger to finger tests were normal. There was no Babinski sign; Gordon and Oppenheim signs were occasionally dorsal in type, and pinching one calf often caused withdrawal of the other leg. The deep reflexes and the abdominal were normal, the cremasteric was diminished.

The spinal fluid was clear, with 4 cells; Wassermann and Nonne reactions were negative. The blood Wassermann reaction was also negative.

Tumor of the base was diagnosed, either in the region of the sella or in the posterior fossa. Radiographic examination showed a distinct change in the posterior clinoid processes; otherwise normal. On the day before operation upward movements of the eyes, of a nystagmoid nature, were present. The right ear still showed diminished reaction to cold. Influenced by the ocular movements and by the symptoms from the vestibular apparatus, suboccipital decompression and exploration of the right posterior fossa were advised. This was done. No tumor was found. The patient died from respiratory failure just as the wound was being closed.

Necropsy Examination. — This revealed a large tumor in the region of the sella turcica, which proved to be an endothelioma. The flattened hypophysis was found in the sella. The tumor had apparently started above the optic chiasm somewhere in the floor of the third ventricle; it was impossible to determine exactly where. The tumor surrounded and included the chiasm in its mass. The floor of the ventricle was pushed upward by the mass and also by a large cyst that appeared to lie on top of the solid tumor. The walls of this cyst paralleled the floor of the ventricle, giving it the appearance of having a false bottom. The posterior end of the cyst was very close to the opening of the aqueduct and doubtless caused a change in the physical conditions thereof. A notable symptom throughout his stay in the hospital was severe headache about three minutes after he changed from a lying to a sitting posture.

Weisenburg in Brain, 1910, divided tumors of the third ventricle into those which obstruct and those which do not obstruct the foramena of Monro or the aqueduct of Sylvius. In Class 3—those which grow into the aqueduct—paralysis of ocular movements, especially upward movements, is mentioned as a common symptom. The cyst in my case probably pressed on the upper end of the midbrain and the nystagmoid movements upward appeared as symptomatic of this irritation.

In tumors in the region of the floor of the third ventricle, as in the cases reported by Dr. Bassoe and Dr. Pollock, the tumors were in the ventricle rather than pushing the floor upward.

TWO CASES OF TUMOR OF THE HYPOPHYSIS.

Presented by Dr. Burrell O. Raulston.

Case 1.—*Adenoma of the Hypophysis with Acromegaly.*—A woman, aged 28, complained of aching pains in the occiput, over the left eye, and a feeling of pressure back of the left eye. These symptoms had been present to some degree for about one year preceding September, 1919, during which time there had been noticed a progressive enlargement of the head, especially the lower jaw, and of the hands, feet and chest. The features had become decidedly coarser and vision had gradually failed, though she could still go about her house work. About one year previous to the above date, she had had three operations on her nose and accessory nasal sinuses within a period of three or four weeks. By one of these operations the left frontal sinus was opened externally. For a period of three weeks following this the frontal pains disappeared and there was a loss of the sense of smell.

The family history contained nothing of importance in connection with her complaint. She had two children, 3 and 5 years old, who were healthy and apparently normal.

The patient was of broad, heavy build with pale thick skin and coarse features. She presented the typical changes found in acromegaly of mild degree. The pupils were unequal and sluggish in their reaction to light and accommodation. A finger could be distinguished by the right eye at a distance of 6 feet, by the left, 8 feet. The right optic disk was pale from secondary atrophy, and in the left there were signs of beginning atrophy. The tonsils had been removed. A careful examination of the nose and nasopharynx revealed no growths. A shadow was cast by each frontal sinus. No abnor-

malities of the chest or abdomen were found, aside from the size and shape of the chest. Examination of the blood and urine revealed no noteworthy abnormalities. Systolic blood pressure was 122, diastolic 80.

Three hundred grams of glucose given by mouth at 7 a. m. failed to produce glucose in any one of hourly specimens during the five succeeding hours.

A diagnosis of tumor of the hypophysis and acromegaly was made. On Sept. 23, 1919, Dr. Dean Lewis attempted to remove a portion of the hypophysis by the nasopharyngeal route. When the floor of the anterior cerebral fossa was perforated it was thought that a large pulsating tumor mass could be felt in the region of the hypophysis. The wound was closed without removing any part of the tumor and the patient died about twenty-five hours later. Previous to the operation the patient's temperature had not been above 99 degrees per os, but shortly before death it reached 106 degrees per rectum.

At necropsy there was found a large bluish pedunculated tumor in the region of the hypophysis, marked flattening and symmetrical enlargement of the sella turcica. Marked increase of intracranial pressure was indicated by flattened gyri and shallow sulci over the cerebral cortex, and a foramen magnum furrow of the cerebellum.

The tumor mass extended from one temporal lobe to the other, a distance of 6 cm., from the anterior border of the pons forward against the frontal lobes, a distance of 4 cm. The tumor projected 2 cm. beyond the level of the frontal lobes. The optic chiasma was between its anterior surface and the frontal lobes of the brain. Each optic nerve was represented by a thin ribbon-like strand of tissue. When the tumor was pushed downward and to the right an irregular nodular portion was seen projecting between the left temporal and frontal lobes.

In histologic sections the predominating type of tissue was necrotic hemorrhagic material. In those regions that were lightest in color as seen macroscopically there were strands and groups of cells that resembled hypophyseal tissue closely and from which a diagnosis of adenoma of the anterior lobe of the hypophysis was made.

Case 2.—*Mixed Cell (Erdheim) Tumor of the Hypophysis.*—A woman, aged 57 years, first seen Feb. 12, 1919, complained of abdominal pain, painful urination, incontinence of urine and vomiting. The pain was cramp-like in the lower left quadrant of the abdomen, present for periods of about one hour at irregular intervals and was usually relieved by a bowel movement. The vomiting had been present about one week and occurred soon after meals. Urination had been painful for about one year; there had been incontinence two or three weeks. For thirteen years she had suffered from what had been diagnosed as gallstone colic, but she had had none of these attacks for three years. She had suffered with shooting pains in the legs for many years, but did not have any feeling of constriction about the trunk. Headaches had been frequent for several years and vision had gradually failed until she became totally blind three months previous to entering the hospital. Poor appetite, dyspnea on exertion and slight cough were also complained of.

The patient was a very obese elderly white woman, complaining of but little pain, but regurgitating brownish fluid frequently, and belching constantly. Vomiting was without distress. She drank frequently but had no desire for food. The pupils were large, round, equal, inactive, the lenses sclerosed and primary optic atrophy definite in each eye.

Further examination of the head and neck revealed no other abnormalities. The heart was thought to be enlarged, though no other definite changes could be determined. Subcrepitant and coarse râles were heard over the entire chest. While the abdomen was somewhat tender in all parts, no rigidity was present nor could any mass be palpated.

Wrist reflexes were not obtained on either side; the elbow reflexes were active, but the abdominal patellar and Achilles' reflexes were absent. The Babinski sign was present on the right side, questionable on the left.

There was a small amount of albumin in the urine, and a leukocyte count of 18,000. The temperature on admission was 100 degrees and it rose to 104 degrees on the second day, when she died. No spinal puncture was done, no blood Wassermann test was made.

The diagnosis was bronchopneumonia (?); syphilis; tabes dorsalis; primary optic atrophy; blindness; chronic myocarditis; ventral hernia.

Necropsy was permitted and the following anatomic diagnosis made: bronchopneumonia; fatty changes of the myocardium; marked hypertrophy and dilatation of the urinary bladder; chronic cholecystitis; cholelithiasis—stone impacted in the cystic duct; tumor of the hypophysis; marked atrophy of the optic nerves; petechial hemorrhages in the renal pelvis, the urinary bladder and the stomach; mild chronic diffuse nephritis; fat infiltration of the renal pelvis; senile sclerosis of the aorta and its main branches; marginal emphysema; moderate obesity; large ventral hernia; healed bilateral fibrous pleuritis.

A study of the brain after hardening in formaldehyd revealed flattened gyri and shallow sulci, especially over the superior and lateral surfaces of the cortex. The olfactory nerves were in their distal half in normal position and were apparently unchanged, but in their proximal half they were pushed laterally and compressed by a tumor mass which projected forward from the region immediately in front of the pons. The optic nerves were closely adherent to and on first inspection appeared to emerge from the sides of this tumor 2 cm. posterior to its anterior margin. The oculomotor nerves were in normal position and extended across the posterior surfaces of the tumor. The other cranial nerves as seen on the brain after removal were in normal position and presented no gross abnormalities. The tumor mentioned above extended from one temporal lobe to the other, with a maximum transverse diameter of 3.5 cm. and from the anterior margin of the pons forward for a distance of 5.5 cm. The visible portion of its surface was irregular in outline and consistency. Some portions had a light bluish color and were covered with a thin membrane, fluctuate, and were found to contain clear fluid. These cystic regions constituted from one-third to one-fourth of the visible surface and the remainder of the mass was about the color of brain tissue, but somewhat more firm. On the anterior superior surface of the tumor, when it was pushed away from the frontal lobes there was a cystic portion that had an anteroposterior diameter of 2 cm. When the brain and tumor were incised transversely through the region of the infundibulum the greatest vertical diameter of the tumor was found to be 3.25 cm. The surfaces made by sectioning the tumor were for the greater part made up of gray, granular material. There were small, irregular round regions of homogeneous, opaque, gelatinous substances, some of which represented coagulated fluid of cysts; others were not surrounded by a membrane. No regions were found that had the firmness of cartilage, nor was any calcium salt found.

On the left lateral wall of the tumor beginning 2.5 cm. posterior to its anterior border there was an oblong brown and yellow body that measured 17 mm. longitudinally, 5 mm. transversely and 8 mm. vertically. Surfaces made by sectioning the body presented solid nongranular yellow and brown tissue arranged in concentric striations about an upper and lower center.

Histologically the tumor contained regions of deeply staining epithelial cells that were irregular in shape and size. Each of these regions was surrounded by a more heavily stained single layer of columnar epithelium. Many cysts were seen. They were likewise surrounded by a single layer of epithelium and contained masses of poorly staining homogeneous substance. An average of about one third of each microscopic field was made up of squamous epithelium that had undergone extensive hyalin degeneration and stained poorly. This tissue was very compact and in most places many layers thick. The nuclei stained poorly and in many places could not be made out at all. There was a large amount of necrotic substance that was in most places surrounded by a vascular connective tissue or columnar epithelium. No cartilage cells were present.

The histology of this tumor conformed to the description of those said to arise from inclusions of the craniopharyngeal duct and described first by Erdheim. The mass was located in the region of the hypophysis and since this gland could not be found it appeared that the tumor arose from inclusions of the above named duct in the anterior lobe of the hypophysis.

DISCUSSION

Dr. Peter Bassoe was interested in Dr. Raulston's remark that in the second case he reported an erroneous diagnosis of tabes was made. There was nothing new about such errors and Oppenheim wrote a paper on this subject some nine years ago (Oppenheim, Ztschr. f. d. ges. Neurol. u. Psychiat. **25**:527, 1914). Clinically, the case seemed quite clearly to be one of tabes and yet no tabes was present but a tumor of the hypophysis, and he confessed that he had made that mistake before.

Dr. Clarence Neymann called attention to some serologic findings in brain tumors which might be of assistance. The Pandy test for globulin in the spinal fluid was not absolute in general use, but was of value in brain tumors as well as in epilepsy. In both diseases, one often found a negative Ross-Jones test and a positive Pandy reaction. The colloidal gold curve obtained in spinal fluids of brain tumor cases very nearly approached that of tabes. He considered these two tests of value in the presence of the Ross-Jones and Wassermann reactions and as being somewhat indicative of such organic brain lesions. The Pandy reaction was a sensitive reaction, and he thought should be employed more than at present.

Dr. Ralph Hamill said that when he was at Dunning he had a case of tumor of the pineal gland with marked ataxia. At postmortem examination the posterior columns were found to stain with osmic acid and also showed some degeneration with Weigert-Pal. There was no evidence of syphilis in the membranes of the spinal cord. To strengthen the supposition that it was syphilitic, about a week before the patient died she had a diplopia which lasted for a day or two and was probably due to a displacement of the tumor process down on the oculomotor centers.

SAN FRANCISCO NEUROLOGICAL SOCIETY

First Meeting, Dec. 5, 1919

WALTER F. SCHALLER, M.D., *President*

SUMMARY OF OBSERVATIONS ON THE TREATMENT OF HYSTERIA WITH ESPECIAL REFERENCE TO RELAPSES. Presented by DR. JULIAN M. WOLFSOHN.

Detailed analysis of the literature and of the cases personally studied by the author has led him to believe that all war psychoneuroses could be segregated into three great groups: (1) hysteria, (2) neurasthenic and emotive states, (3) a combination of (1) and (2). Each of these three groups show one or all of the fundamental defense reactions of physical or psychic pain, fatigue and fear. Traumatic psychoneuroses resulting from injuries incurred in industrial accidents and those of civilian life often present the syndrome of war psychoneuroses in as complete a form as is seen in the pathology of war.

In the treatment of psychoneuroses, whether due to accidents of war or industry or to the defense reaction found in an intolerable environment in civilian life, should not all cases be susceptible to cure by the same means? Some critics say, "No"; that the psychoneurotics of civilian life are not amenable to the methods used in the army in which all patients are under the thumb of discipline and in which compensation, as such, is a negligible quantity. As a matter of fact, military, civilian and industrial cases of hysteria are cured of their symptoms in the same way, by reeducative methods, even after other long, previously unsuccessful, methods have been used

This report is based on 1,550 cases of psychoneuroses—type-conversion hysteria—treated and cured of their functional disabilities by the method described in a previous paper (J. A. M. A. **71**:2057 [Dec. 21] 1918). These cases represent: hysteria directly resulting from war activities, 1,500; traumatic hysteria of civilian life (industrial accidents), 10; conversion hysteria (emotional in origin) of civilian life, 40.

No patient was treated unless at least an "outward" desire for recovery was shown. This was the signal for a shorter or longer talk with the patient of a psychanalytic nature in which dreams were interpreted and complexes unearthed. It was at once seen that patients without much outward emotivity could be cured without extended psychanalyses, while those presenting evident emotivity as a symptom, required prolonged analyses. When there were many patients awaiting treatment, and at times there were from ten to twelve in a day, a glance at the table of relapses shows that it was impossible to make sufficiently detailed psychanalyses. Hence, patients with conversion hysteria associated with emotivity were prone to relapse when an unfavorable environment was encountered.

The results of treatment in a former series of 573 cases are merely accentuated by this series which is twice as large. One fact stands out boldly, however, and that is the great value of preparing the patient for cure by psychanalysis and dream analysis. This is necessary in every case in order to unfold the causative psychic factor. The difficulty of treatment with repressions such as these is apparent when psychanalytic methods are ignored.

The author's interest was early aroused as to what percentage of his patients would relapse after the treatment and cure of the functional disability. For this reason, each patient was given, on discharge, two postals to

the author—one dated three months and the other six months after the cure. Of the first 500 replies it was found that definite relapses occurred in 16 per cent., or eighty cases. Four hundred and twenty patients wrote that they had remained perfectly well three and six months after treatment although many of them had returned to the former environment.

The patients who suffered were: twelve mutes, seventeen aphonics, thirty-eight stammerers, twelve tremblers, one ticquer. In each one of these at the time of cure, emotivity evidenced by easy blushing, fears of various kinds, headache, insomnia, terrifying dreams, starting reflex, etc., was a part of the symptomatology of the disease. This residual emotivity when present was the cause of the relapse. Sudden shock, noises, crowds, bewilderment or even an environment in which fear plays an important part, may be the starting point of the relapse. Hysterical cases incurred in the army; in industrial life, in which compensation was a factor; and, finally, in civilian life where emotivity pure and simple was the cause, were described.

As vivid, terrifying dreams often cause the sudden cure of a disability—e. g., a mute will awaken to find himself shouting and will thereafter be able to speak—so the terrifying dream is also potent, when emotivity exists, as a factor in the relapse. Therefore, it was early seen that, in order to treat successfully for permanency of results, a course in mental catharsis was necessary to clear the psychic factor or minimize it and that it is the most helpful means at our disposal to prevent relapses.

After having seen psychoneuroses under the most varied guises, the author says one of the most important conclusions can be drawn—that hysteria of whatever cause has an essentially psychic character and gives origin exclusively to psychogenetic disorders and that, when a painstaking psychanalysis is made, suggestion is easier to administer and ultimate results are far happier.

DISCUSSION

Dr. Thomas G. Inman said that in his experience the question of cure in hysteria was a difficult, if not an impossible, one to decide. He had known somatic symptoms to remain absent for more than twenty years only to recur under the influence of a new emotional stress. There was much similarity between the patients observed as war cases and those seen at home, and he thought the mechanism was the same. After proper preparation a cure at one seance was thought to give the best results as regards economy of time, and it did not seem to make much difference what means was used so long as the suggestion was sufficiently firm. There seemed to be considerable difference in the intensity of the fixation in different persons, some recovering during the process of examination while others resisted the most extreme measures. Yet all are amenable to symptomatic cure by some method, the difficulty being in the selection of the proper one.

Dr. Harold W. Wright wished to express his agreement with Dr. Wolfsohn as to the value of psychanalysis in bringing about a fundamental cure of traumatic hysteria or other forms of psychoneurosis. However, the mental complex is not always so obscure or so deeply subconscious as many psychanalysts would have us believe. As to the war neuroses, he thought that all who were working in this field, especially overseas, agreed pretty well as to their nature and their mechanism; in fact, it was striking to see so little disagreement as the war progressed. Of course, in the rush of patients during the period of hostilities and the necessity of getting as many as possible of the men back to duty in a short time, it was not possible for those who

were on duty in France to practice very thorough psychanalysis. One had to be content with removing symptoms first of all and this was found to be fairly easy. But it was always explained to the patient how the cure was produced in such a way as to convince him that he had not sustained any organic lesion, analyzing his case for him briefly in order to fortify him against relapse. Often it seemed essential to assure the patient first of all that he would not again be sent to the fighting zone after being cured, but would be given duty in the intermediate zone for which he would be quite fit. In this way 80 per cent. of our patients were made fit for some form of duty within an average period of three weeks. Those physicians who worked in the advance hospitals in France and received patients soon after onset were in an exceptionally favorable situation to obtain results because there had been no chance for the neurosis to become fixed or aggravated by delayed treatment or by unwise suggestions resulting from many examinations by various physicians who were not sure of their diagnosis. It is deplorable that the traumatic neuroses of civil life cannot be controlled as promptly and as efficiently.

SURGICAL EXPERIMENTS IN THE ARMY WITH ORGANIC LESIONS OF THE NERVOUS SYSTEM. Presented by Dr. Howard C. Naffziger.

Brain injuries are treated chiefly at the front in the farthest advanced hospitals. Peripheral nerve injuries are treated at the bases most remote from the front. With the former the most profitable observations have been made along physiologic and bacteriologic lines, i. e., the reaction of the central nervous system to trauma, hemorrhage and infection. With these gross lesions, detailed neurologic study is not practicable, necessary or profitable at the front. More is gained from later study when the complicating factors have been removed. The principles guiding surgery of the brain in war wounds are given.

Peripheral Nerve Injuries: The methods of examination and records are discussed. Emphasis is given to the necessity of recording voluntary power in the individual muscles. For each nerve a chart is shown which lists the muscles in the sequence in which they receive their nerve supply. Proper spaces are allowed for recording faradic and galvanic reaction of each muscle, on the same chart. Two examinations, one month apart, are considered necessary in order to form a proper estimate of the progress of a case.

Joint stiffness has been a most troublesome complication. Much emphasis has been placed on the necessity of using splints to prevent overstretching of paralyzed muscles. As a result, most of the patients have worn splints. Unfortunately, in many the mobility of the joints has been sacrificed. The parts have not been put through their full range of motion at sufficiently frequent intervals to preserve mobility. The improper use of splints has contributed greatly to the disability. Vasomotor, trophic changes and atrophies have been more pronounced when the part has not been used.

End to end suture of nerves with accurate approximation is considered the most favorable operative procedure. While "cable grafts," i. e., autografts of several strands of nerve from the same person, are used when end to end suture cannot be performed, it has rarely been necessary. With increased operative experience grafts are more and more rarely necessary. Mobilization of nerves, transposition and correct joint positions enable one to secure end

to end suture in ulnar, musculospiral and sciatic nerves with gaps of 10 or more centimeters. Greater gaps can be overcome by two stage operations.

Technical details in methods of exposure, handling of nerves, examination of neuromas and nerve suture were presented and illustrated by drawings by Mr. Ralph Sweet. Two reels of moving pictures showing ulnar, median, musculospiral, external popliteal, sciatic, faciohypoglossal and facial paralyses were shown. In each of these the paralyzed extremity was compared with the normal one and methods of examination for individual voluntary muscle power were shown. Each part was put through the full range of all voluntary movements under examination and the characteristic attitudes, atrophies, gaits, etc., were shown.

DISCUSSION

Dr. Thomas G. Inman stated that frequent electrical examination gave the most trustworthy information as to the severity of a nerve injury in the absence of evidence as to the exact nature and extent of the injury. Rapidly diminishing galvanic irritability spoke for the separation of the continuity and operation should not be too long delayed. The moving pictures of nerve injuries and the disturbances in function associated with them were exceedingly clear and complete and would be invaluable for class instruction.

Dr. Harold W. Wright had the pleasure of seeing the first hundred of the series of cases at Letterman Hospital with Dr. Naffziger. He mentioned a few facts that seemed to be of great help in arriving at a conclusion as to the prognosis of unoperated cases and as to the decision whether or not to operate.

One of the most important is a tenderness of the muscles supplied by the affected nerve which is always present when the nerve is regenerating and which may be found before voluntary power is apparent. This sign, together with an advancing tingling on percussion, or Tinel's sign, seemed to him to be very assuring and this was borne out by subsequent examinations. As to the electrical reactions, he felt that they should not be taken too seriously in these peripheral nerve wounds because often reactions of a degenerative type have been observed when voluntary power is present in some of the muscles or has returned to them so that it would not be safe to advise operation solely on account of the electrical responses. Another point worth emphasizing is the importance of excluding compensatory action of other muscles physiologically related and this can be done only by testing each muscle carefully and securing a posture of the part tested which will prevent the action of normally acting muscles. This was well shown in Dr. Naffziger's pictures. It is easy to be misled in this matter, especially when testing the small muscles of the hand.

MINNESOTA NEUROLOGICAL SOCIETY

Regular Meeting, Feb. 17, 1920

Charles R. Ball, M.D., *President*

A PROBABLE CASE OF MARIE'S HEREDITARY CEREBELLAR ATAXIA. Reported by Dr. C. E. Riggs.

From the "erratic" cases of Friedreich's ataxia, Marie, twenty-seven years ago formulated a syndrome which he believed differed both clinically and anatomically from that disease. In such cases, ataxia develops in the lower extremities after the twentieth year; several years later the arms are affected;

there are nystagmus, speech disturbances, optic atrophy and loss of pupillary reaction to light. The knee jerks may be normal or spastic; ankle clonus may be present; deformities of foot or spine are wanting; pain in the lower limbs and disturbances of sensibility occur; mental impairment has been observed.

My patient's syndrome may be considered "erratic" when contrasted with either Marie's hereditary cerebellar ataxia or Friedreich's disease. He was 24 years of age. The family history was negative. He had had the usual childhood infections. Unsteadiness in standing and walking began in the eighteenth year; the arms became affected four years later.

The pupils reacted normally to light and accommodation. There was no nystagmus. The eye grounds were normal. Speech was slow and hesitating. He experienced difficulty in uttering words and framing sentences. Knee and Achilles' reflexes were active and the Babinski sign was present on both sides. Ankle-clonus was present but of short duration. The superficial reflexes were normal; there was no disturbance of sensation. On losing his balance, he fell unless he was able to grasp something to support himself. When he tried to run his feet moved like flails and he did not move as rapidly as when walking; otherwise the result of the examination was negative.

We now believe that Marie's syndrome is a variety of heredo-degenerative disease of which the Friedreich syndrome is the most frequent expression; it has an endogenic basis and is characterized by steady progression. The observations of Bing and Thomas and Roux have made this clearly apparent. Clinically, we know that the Marie syndrome occurs in children as well as in adults; that the optic nerve and general sensibility may both be intact; that "the Friedreich foot" may occur; that generally the pupillary light reflex is absent, and finally that the normal or exaggerated knee jerk which has been commonly regarded as an absolute sign of distinction between these two conditions, may be increased or spastic at first and afterward lost during the course of the disease. Hence all the clinical and anatomic boundaries that have been supposed to exist between the Marie and Friedreich syndromes disappear, giving us a resulting simplicity of conception long sadly needed.

ATYPICAL JACKSONIAN EPILEPSY. Presented by DR. E. M. HAMMES.

A man, aged 27, was wounded June 7, 1918, in the left occipital region by shrapnel, but he continued to advance. About one hour later, he was wounded in the left arm and soon after a bullet passed through both thighs. He retreated and in about five hours (as far as he knows) became unconscious. He remained so for twelve days and in a semiconscious state for ten days longer. He then discovered that he was in a hospital near Paris, that he was unable to talk and that his right arm was paralyzed. By October, 1918, he had recovered completely, except for numbness in the palmar surface of his right hand which has remained. In November, 1918, he developed an attack that began with an increase in the numbness of his right hand which gradually extended up the arm to the shoulder where it stopped. About this time he developed motor aphasia. This condition gradually subsided after about one-half hour. He had three similar attacks, one in March, one in May and one in November, 1919. He has no other complaint.

The results of the neurologic examination were negative throughout. He had a superficial scalp scar over the left posterior occipital region. A roentgen-ray picture of the skull revealed a foreign body (probably steel) in the left

occipital region and in the left upper parietal region immediately beneath the skull.

This patient probably had a subdural hemorrhage with subsequent adhesions.

HEMORRHAGE IN THE CAUDA SECONDARY TO LUMBAR PUNCTURE. Dr. E. M. Hammes reported the case.

A man, aged 34, with a negative family and personal history, developed epidemic cerebrospinal meningitis in March, 1918. He was given daily intraspinal injections of antimeningococcic serum and he improved after the first five injections. During the sixth lumbar puncture at the third lumbar interspace, before any serum had been injected (according to the patient's statement, no records are available) he suddenly developed a flaccid paralysis of both lower extremities with loss of sensation. He had loss of sphincter control and had to be catheterized for two weeks, after which he gradually improved. Dec. 15, 1919, he had entirely recovered except for attacks of weakness in the lower extremities after exertion, which lasted for several hours. He described the attacks thus: After working for about six hours (section hand) he notices a weakness in both lower extremities, which becomes more marked and in about one-half hour his knees suddenly give way and he falls. The muscle strength returns after about thirty minutes' rest, when he can again resume his work.

The results of the neurologic examination were negative, except that both knee jerks and Achilles' reflex were absent. There were no sensory disturbances or atrophies in the lower extremities.

A REPORT OF NINE CASES OF MENINGO-ENCEPHALITIS. Presented by Dr. C. E. Nixon.

These cases occurred in a village in southwestern Minnesota. Five occurred in two related families and there were five deaths. The first possible case was that of a youth, aged 19, who came home one night complaining of not feeling well. The following morning he was nauseated and "felt tired." At night he became restless and delirious with periods of unconsciousness, and he died the next morning. The second patient had been visiting in the village for three days, leaving the day after the death of the first patient. While on the train going home he became ill, and within six hours after the onset became unconscious and died in about twelve hours. The diagnosis was said to have been spotted fever. The cases following these two showed well marked meningeal symptoms. The spinal fluids, however, were not positive for the meningococcus. Necropsies of two showed well marked meningeal exudate; unfortunately, a microscopic examination of the brains was not made. Most of the patients had well marked cranial nerve involvement. The last case was that of a boy, aged 12, who became ill twenty days after the first patient. For seven days of his illness, he showed no evidence of meningeal irritation, but had definite symptoms of encephalitis. Respiration was deep and rapid—from 40 to 60 a minute. He had diplopia, strabismus and nystagmus. He was semidelirious, muttering unintelligent phrases and picking at "objects" in the air. There was a twitching of the skin of the face. He complained of pain in the extremities, but was not sensitive to touch or pressure. He was definitely lethargic, and complained of feeling tired and drowsy. When aroused, he answered questions clearly, and memory was unimpaired. There was a coarse, jerking movement of the extremities, somewhat resembling chorea.

After the first week of his illness, he developed rigidity of the neck and a positive Kernig's sign. The cell count of several spinal fluid examinations was relatively low, and the meningococcus was not found by smears, inoculations or cultures. Microscopic examination of the patient's brain demonstrated perivascular infiltrations of lymphocytes and other changes in the brain stem and basal ganglions, commonly reported in epidemic encephalitis.

Book Reviews

DISEASES OF THE NERVOUS SYSTEM: A TEXTBOOK OF NEUROLOGY AND PSYCHIATRY. By Smith Ely Jelliffe, M.D., Ph.D., formerly Professor of Psychiatry, Fordham University, New York, and formerly Adjunct Professor of Diseases of the Mind and Nervous System, New York Post-Graduate Medical School and Hospital; and William A. White, M.D., Superintendent of St. Elizabeth's Hospital, Washington, D. C.; Professor of Nervous and Mental Diseases, George Washington University, and Lecturer on Psychiatry, U. S. Army and U. S. Navy Medical Schools. Third Edition, Revised, Rewritten and Enlarged. Cloth. Pp. 1018, illustrated with 470 engravings and 12 plates. Philadelphia and New York: Lea & Febiger, 1919.

A departure from orthodox classifications of nervous diseases must be viewed with considerable interest. In this volume the authors propose a classification in which the nervous system is divided into three levels of activity: the vegetative, the sensorimotor and the psychic. In the region of vegetative neurology, "a rich variety of disturbances is found, involving the glandular, gastro-intestinal, genito-urinary, vascular, respiratory, muscular, cutaneous and bony systems. In addition, there are certain complex clinical groups involving, for the most part, the glands of internal secretion, the endocrinopathies." The "field of sensorimotor neurology, including the disorders of the cranial and peripheral nerves, the spinal cord, the medulla, pons, brain stem, midbrain, cerebellum and cerebrum is that portion of neurology to which the term 'neurology' is generally thought of as applying to all intents and purposes, exclusively." The third and the highest level is the psychic.

The inclusion of disorders of the vegetative system in a textbook of nervous diseases is timely and proper. As to how much space should be allotted and how much importance be given them, doubtless opinions would differ. They fill 162 pages out of a total of 649 on descriptive neurology.

The first chapter is devoted to methods of examination of the nervous system. This is well presented and includes an adequate description of the examination of the vegetative system. Methods of mental examination are briefly sketched and several good questionnaires included. Electric examination is barely mentioned; no reference is made to technic or indications. There is throughout a strong tendency to refer to theories which are more or less controversial. In discussing organ inferiority (page 25) the authors refer to the recent observation, that, "in the ascendants of pellagrins there was a noticeable tendency to diseases of the skin and of the gastro-enteric tract. In the interpretation of such a fact the evident relationship of the skin, mucous membrane of the stomach and intestines has to be correlated with the presumed etiologic factor of the disease as worked out by Goldberger and his associates." Part I is devoted to vegetative or visceral neurology and the endocrinopathies and considerable controversial matter is included. Reference to the influence of psychoneuroses, hysterical conversions, compulsive tics and psychotic projections on pupillary inequalities and sympathetic paralysis, are a reflection of the authors' views on the influence of the unconscious and the importance of psychanalysis. A psychically determined erythromelalgia is mentioned. It is said that Raynaud's disease may be of psychic origin

(shock, hysteria, schizophrenia), and the treatment of such an erythromelalgia is stated to be psychanalysis, and of Raynaud's disease, psychotherapy. In discussing the etiology of scleroderma the authors think that "inasmuch as many, if not most, hyperthyroidisms are distinctly psychogenic, at least in the initial stages, it is not an unreasonable hypothesis that psychogenic factors may form a part of the scleroderma pathogeny." In the chapter on the endocrinopathies are included such diseases as myasthenia gravis, myotonia congenita, myotonia atrophica and the myopathies.

Stronger evidence of the devotion of the authors to the psychanalytic school is found in their statement (page 283) that "unconscious sadistic states produce transitory and even chronic arthritic changes."

In the description of sensorimotor neurology an occasional contradictory statement is found. Although on page 249 it is stated that among the neighborhood symptoms of diseases of the hypophysis "the optic nerve changes, bitemporal hemianopsia, are the most important," on page 304 the authors say that "a lesion behind the chiasm, usually in the sella turcica, and not infrequent, as in pituitary disease, causes a binasal hemianopsia, partial or complete."

The authors say that "a true psychogenic tic douloureux is always a possibility," and "psychogenic cases which are numerous are curable by psychanalysis." This may be true of face pain. It certainly is not true of tic douloureux. The true significance of "dolorgenetic" (algigenetic) zones in tic douloureux is not properly interpreted and hypersensitive Valleix's points are confused with them.

One page is devoted to the infectious types of multiple neuritis, whereas about four pages are devoted to the thalamic syndrome. Notable, likewise, is the large amount of space devoted to sensory changes in cortical lesions—a highly controversial subject—in contrast to the small amount apportioned to the hemiplegic state. The statement that treatment by alcohol injections is without avail in causalgia is not in accordance with the reviewer's experience. Peripheral nerve injuries are well described. Some of the matter included, such as the classifications of Mme Dejerine and Mouzon, has already been discredited.

The lesions at the level of the medulla, pons, brain stem or midbrain are brilliantly described. The numerous illustrations from Dejerine help to make the chapters on localization in the brain and cord of great value. The cerebellar syndromes and the paralysis agitans group of diseases are treated well and in accordance with recent studies of these disorders. The chapter on neurosyphilis is very satisfactory.

The introduction to Part III, psychical or symbolic systems, is illuminating. From the student's standpoint it could, perhaps, be said that the various theories, other than Freud's, of the pathogenesis of the neuroses, should receive more liberal consideration. The symptomatology of hysteria is too briefly described.

The technic of psychanalysis is comprehensively presented. As most of the students of a textbook of neurology will not be able to put into practice, personally or vicariously, the method of psychanalysis, it seems to the reviewer that some space should have been allotted to the description of other methods of treatment which are successful in removing at least some of the symptoms of the neuroses. As could be expected, the authors devote considerable space to the consideration of the "meaning of the attack" in epilepsy, emphasizing the relation of the attack to a wish fulfilment, whereas practically nothing is said of other important theories of the pathogenesis of the epileptic convulsion.

The chapters on the psychoses present in an orderly, condensed, but comprehensive manner, the descriptions of the various insanities. They include the more recent views of the pathogenesis of some of the symptoms, which are presented in a clear and acceptable manner.

The volume is an important contribution to publications on neuropsychiatry. It contains within a small space a digest of much of the recent work on the unconscious, the vegetative system, the physiology of the nervous system and localization of lesions. It makes this matter accessible to some who could not otherwise become familiar with it. If the volume were intended only for the use of those familiar with neurology, it supplies a well-defined need. As a textbook for students and as a guide for the general practitioner its value is questionable. It contains a great amount of information and much that is most interesting but in its use the inexperienced student will need the constant assistance of a compent mentor.

NERVOUS AND MENTAL DISEASES. By ARCHIBALD CHURCH, M.D., Professor of Nervous and Mental Diseases in Northwestern University Medical School, Chicago; and FREDERICK PETERSON, M.D., formerly Professor of Psychiatry, Columbia University. Ninth edition, revised. Octavo volume of 949 pages, with 350 illustrations. Philadelphia and London: W. B. Saunders Company, 1919. Cloth, $7.50 net.

This being the ninth edition of what has proved to be a standard textbook, a detailed review is superfluous; especially, as the present edition differs but little from the preceding one, except that "the subjects of general paresis and traumatic insanity have been rewritten."

Avowedly the authors have in mind the immediate needs of the average medical student and general practitioner, and these needs are well met. Both authors have the art of simple and clear statement, they avoid hypotheses and controversial matter and they show excellent discrimination between the essential and nonessential.

In the department of nervous diseases one might desire a little more careful revision. Somewhat at random we note: that in the treatment of trifacial neuralgia, much of the matter is antiquated and some inaccurate—e. g., the statement that Spiller and Frazier divide "the sensory root above the ganglion but outside the skull;" that the distinction between tic and spasm is not clearly drawn; that the essentially toxic origin of angioneurotic edema is scarcely indicated. In a few places the bibliographic references and statements of priority are inaccurate.

On the other hand, many chapters are models for the end in view. We may instance those on arterial brain diseases and on tumors of the brain, and there is an excellent table of the symptoms caused by a cord lesion at different levels.

The 231 pages on mental diseases contain about as good an exposition of the subject as could be presented within such limits. But we suspect that the authors' personal predilections have had something to do with the relative space given to different subjects. Why should a brief textbook for students and general practitioners be lumbered with twenty pages on craniometry, palates, ears, etc., and only the same number given to manic-depressive insanity including involutional melancholia? Why should idiocy fill more than twice as many pages as dementia praecox and general paresis combined? But the modified table of Preyer on the steps of development of the normal child is excellent for a textbook and too rarely included.

The printing is good, the illustrations excellent and the index complete.

THE DIAGNOSIS OF NERVOUS DISEASES. By Sir James Purves Stewart, K.C.M.G., C.B., M.D., Edin., F.R.C.P. 557 pages. Edward Arnold, London. 1920. Fifth edition.

The fact that this book has reached the fifth edition is sufficient evidence of its usefulness and popularity. While the present edition has been revised and partly rewritten, there is practically no change in its makeup. An additional chapter has been added on the war neuroses regarded from the clinical standpoint; no attempt is made in this chapter of about twenty-two pages to discuss theories. The discussion on the organic war lesions is continued and is a valuable addition to war neurology.

The other parts of the book have been revised here and there; some illustrations have been added and these are uniformly excellent. The chapters on peripheral nerve conditions have been revised and are excellent. Perhaps only in the discussion of cerebellar diseases has advantage not been taken of recent ideas on cerebellar localization and function. There is, however, very little fault to find, for Stewart's diagnosis of nervous diseases is too well and favorably known to merit other than favorable criticism.

The American Medical Association will pay 50c each for the April and May, 1919, issues of the Archives of Neurology and Psychiatry. Address to American Medical Association, 535 North Dearborn St., Chicago, Ill.